

# **OPERATORS MANUAL AND PARTS CATALOG**

FOR



**ELECTRIC GENERATING SETS**

**CCK  
SERIES**

SPEC A THROUGH K

*Garage*

## **INTRODUCTION**

THIS OPERATOR'S MANUAL CONTAINS INFORMATION PERTAINING TO THE INSTALLATION, OPERATION, AND MAINTENANCE OF YOUR ONAN UNIT. A PARTS CATALOG IS ALSO INCLUDED IN THIS MANUAL.

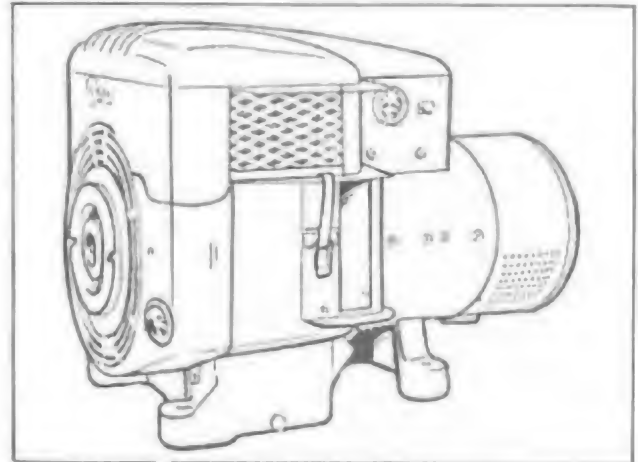
WE SUGGEST THAT THIS MANUAL AND THE WIRING DIAGRAM WHICH ACCOMPANIES EVERY ONAN UNIT BE RETAINED AND REFERRED TO WHEN MAKING EQUIPMENT ADJUSTMENTS OR ORDERING PARTS. ADDITIONAL COPIES ARE AVAILABLE FOR A NOMINAL CHARGE FROM YOUR ONAN DISTRIBUTOR.

WHEN ORDERING PARTS REMEMBER TO INCLUDE THE ONAN MODEL, SPECIFICATION LETTER, AND SERIAL NUMBER LOCATED ON THE NAMEPLATE OF YOUR ONAN UNIT. THIS IS ESSENTIAL TO ENSURE THE CORRECT PART IS SHIPPED TO YOU.

FOR MAJOR REPAIR SERVICE, CONTACT YOUR ONAN AUTHORIZED DISTRIBUTOR.

# GENERAL INFORMATION

When instructions in this manual refer to a specific model of generating plant, identify the model by referring to the **MODEL AND SPECIFICATION NO.** as shown on the plant nameplate. Electrical characteristics are shown on the lower portion of the plant nameplate.



TYPICAL MODEL CCK

How to interpret MODEL and SPEC. NO.



1. Factory code for general identification.
2. Specific Type:  
**M - MANUAL.** Manually cranked for permanent or portable installations.  
**E - ELECTRIC.** Electric starting at the plant only.  
**P - PORTABLE.** Pull rope starting. Mounted in carrying frame for portable use.  
**R - REMOTE.** Electric starting. For permanent installation, can be connected to optional accessory equipment for remote or automatic control of starting and stopping.
3. Factory code for optional equipment.
4. Specification (Spec.) letter (advances when factory makes production modifications).

## CAUTION

Onan uses this symbol throughout the text to warn of possible equipment damage.

## WARNING

This symbol is used to warn of any possible personal injury.



## MANUFACTURER'S WARRANTY

Onan warrants to the original user that each product of its manufacture is free from defects in material and factory workmanship if properly installed, serviced and operated under normal conditions according to Onan's instructions.

Onan will, under this warranty, repair or replace, at Onan's expense, any parts which an independent shop deems to be Onan's responsibility or have been defective in material and workmanship provided that such part shall be returned to Onan's factory or one of its Authorized Service Stations, transportation charges prepaid, not later than one (1) year after the product is first placed in service. Such defective part will be repaired or replaced free of charge, including labor (in accordance with rates suggested by Onan) during the standard one (1) year warranty under this warranty.

THIS WARRANTY AND ONAN'S OBLIGATION THEREUNDER IS LIMITED TO ALL WARRANTIES, EXPRESSED OR IMPLIED INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS OR LIABILITIES INCLUDING LIABILITY FOR INCIDENTAL AND CONSEQUENTIAL DAMAGE.

No person is authorized to give any other warranty or to promise any other liability on Onan's behalf unless made or assumed in writing by an officer of Onan, and no person is authorized to give any warranty, or to assume any liability on the Seller's behalf unless made or assumed in writing by such Seller.

**ONAN**

4000 72ND AVENUE S.W. • MINNEAPOLIS, MINNESOTA 55412

# SPECIFICATIONS

## £ MODEL SERIES

M = manual start

R = remote start (electric crank)

	3.5CCK* 4.0CCK**		4.0CCK* 5.0CCK**	
	M	R	M	R
Nominal dimension of plant (inches)				
Height . . . . .	21	21	21	21
Width . . . . .	21	21	21	21
Length (3 and 4 wire models, add 1 inch) . . . . .	26-3/8	26-3/8	30	30
Number cylinders (horizontally opposed) . . . . .	2	2	2	2
Displacement (cubic inch) . . . . .	49.8	49.8	49.8	49.8
Cylinder bore . . . . .	3-1/4	3-1/4	3-1/4	3-1/4
Piston stroke . . . . .	3	3	3	3
RPM (for 60 hertz) . . . . .	1800	1800	1800	1800
RPM (for 50 hertz) . . . . .	1500	1500	1500	1500
Compression ratio, Standard . . . . .	5.5:1	5.5:1	5.5:1	5.5:1
high compression . . . . .	7:1	7:1	7:1	7:1
Compression Pressure (lbs) at cranking speed (approx. 500 rpm)				
Standard heads . . . . .			105-110	
High-Compression heads . . . . .			130-135	
Ignition (type)				
Battery . . . . .	No	Yes	No	Yes
Flywheel magneto . . . . .	Yes	No	Yes	No
Battery voltage (AC plant) . . . . .	None	12 volt	None	12 volt
Battery size (AC plant):				
SAE group 1H . . . . .		two in series		two in series
Amp/hr. SAE rating - 20 hr. (nominal) . . . . .		105		105
Starting by pull rope (recoil) only . . . . .	Yes	No	Yes	No
Starting by exciter cranking . . . . .	No	Yes	No	Yes
Starting by starting motor ★ . . . . .	No	No	No	Yes
Battery charge rate amperes . . . . .	6 Max.	6 Max.	6 Max.	6 Max.
Ventilation Required (cfm 1800 rpm)				
Engine (Pressure Cooling) . . . . .	500	500	500	500
Engine (Vacu-Flo Cooling) . . . . .	750	750	750	750
Generator . . . . .	75	75	75	75
Combustion . . . . .	32	32	32	32
Output rated at unity power factor load . . . . .	All	All	All	All
Rating (output in watts)				
*50 hertz AC intermittent service . . . . .	3500	3500	4250	4250
*50 hertz AC continuous service . . . . .	3500	3500	4250	4250
**60 hertz AC intermittent service . . . . .	4000	4000	5000	5000
**60 hertz AC continuous service . . . . .	3500	3500	5000	5000
AC voltage regulation in ± % . . . . .	4	4	5	5
AC frequency regulation in % . . . . .	5	5	5	5
Revolving armature type generator . . . . .	Yes	Yes	Yes	Yes
120/240 volt single phase model reconnectable . . . . .	Yes	Yes	Yes	Yes
Rotating type exciter . . . . .	Yes	Yes	Yes	Yes
Oil capacity in U.S. quarts (Refill) . . . . .	4	4	4	4

\* - Basic 50 hertz model.

\*\* - Basic 60 hertz model.

★ - Remote model 5.0CCK-150R only (Magnet Service DC Plant).

£ - New model designations shown, begin during 1969. Previous designations did not use a decimal in the KW rating. EXAMPLE: 3.5CCK was formerly 305CCK and 4.0CCK was formerly 4CCK.

NOTE: Hertz is a unit of frequency equal to one cycle per second.

# DIMENSIONS AND CLEARANCES

All clearances given at room temperature of 70°F.  
All dimensions in inches unless otherwise specified.

	MINIMUM	MAXIMUM
Valve Stem in Guide – Intake . . . . .	0.001	0.0025
Valve Stem in Guide – Exhaust . . . . .	0.0025	0.004
Valve Seat Interference Width . . . . .	1/32	3/64
Valve Face Angle . . . . .		44°
Valve Seat Angle . . . . .		45°
Crankshaft Main Bearing . . . . .	0.0025	0.0038
Crankshaft End Play . . . . .	0.006	0.012
Camshaft Bearing . . . . .	0.0015	0.003
Camshaft End Play . . . . .	0.003	
Rod Bearing (Aluminum Rod) . . . . .	0.0020	0.0033
Rod Bearing (Forged Rod) . . . . .	0.0005	0.0023
Connecting Rod End Play . . . . .	0.002	0.016
Timing Gear Backlash . . . . .	0.002	0.003
Oil Pump Gear Backlash . . . . .	0.002	0.005
Starter Gear Backlash . . . . .	0.010	0.025
Piston to Cylinder, Conformatric Type (Measured below oil-controlling ring – 90° from pin) Clearance . . . . .	0.0015	0.0035
Piston Pin in Piston . . . . .	Thumb Push Fit	
Piston Pin in Rod . . . . .	0.0001	0.0006
Piston Ring Gap in Cylinder . . . . .	0.010	0.023
Crankshaft Main Bearing Journal – Standard Size . . . . .	1.9992	2.000
Crankshaft Rod Bearing Journal – Standard Size . . . . .	1.6252	1.6260
Cylinder Bore – Standard Size . . . . .	3.249	3.250
Valve Tappet Adjustment		
Intake . . . . .	0.006	0.008
Exhaust . . . . .	0.015	0.017
Magneto Pole Shoe Air Gap . . . . .	0.010	0.015
Breaker Point Gap (Full Separation) . . . . .		0.020
Spark Plug Gap – For Gaseous Fuel . . . . .		0.018
Spark Plug Gap – For Gasoline Fuel . . . . .		0.025
Ignition Timing Advance (Engine Running) . . . . .		19°BTC

---

# ASSEMBLY TORQUES

---

## ASSEMBLY TORQUES

Assembly torques as given here require the use of a torque wrench. These assembly torques will assure proper tightness without danger of stripping the threads. If a torque wrench is not available, you will have to estimate the degree of tightness necessary for the stud, nut or screw being installed and tighten accordingly. Be careful not to strip the threads. Check all studs, nuts and screws often. Tighten as needed to prevent them from working loose.

BOLT TORQUE	FT.-LB.
Rear Bearing Plate Nuts . . . . .	20-25
Connecting Rod Bolts	
Aluminum Rod . . . . .	24-26
Forged Steel Rod . . . . .	27-29
Oil Pump Mounting Screws . . . . .	7-9
Oil Base Screws . . . . .	43-48
Generator Adapter Screws . . . . .	20-25
Timing Gear Cover Screws . . . . .	15-20
Magneto Stator Screws . . . . .	15-20
Cylinder Head Screws . . . . .	29-31
Fuel Pump Mounting Screws . . . . .	10-15
Flywheel Mounting Screws . . . . .	35-40
Manifold Screws - Intake & Exhaust . . . . .	15-20
Spark Plugs . . . . .	25-30
Blower Housing Screws . . . . .	10-15
Valve Cover Nut . . . . .	4-8
Carburetor Mounting Stud Nuts . . . . .	8-12
Armature Through Stud Nut . . . . .	35-40
Generator Through Stud Nut . . . . .	14-16
Starter Mounting Bracket to Oil Base Screws . . . . .	43-48

# INSTALLATION

## GENERAL

Important installation points are: sufficient cooling, exhaust gas discharge, electrical and fuel connections, location and mounting.

Each installation must be considered individually - use these instructions as a general guide. Always check local building codes, fire ordinances, etc., for compliance. Provide a location that is protected from the weather, dry, dust free, and preferably warm in cold weather. The air discharge side of plant requires only 3" clearance from wall to permit plant to rock on its mounts, but at least 24" clearance is required around all other sides for service accessibility.

## MOUNTING (See Fig. 2)

Permanent installations need a sturdy, level, mounting base of concrete, heavy wood or structural steel at least 12" high to aid oil changing and operating.

Carefully assemble the mounting cushions, washers and spacer bushing (Fig. 2). The spacer bushing prevents compression of the snubber (upper rubber cushion). Space the 5/16" mounting bolts as shown.

## VENTILATION AND COOLING

Air circulation is needed to dissipate heat produced by the engine and generator in normal operation. Outdoor installations can rely on natural circulation, but indoor or housed installations need proper size and positioned vents for required air flow. See specifications for the air requirements at 1800 rpm.

Auxiliary fans can be used to increase air flow to units installed in small, poorly ventilated rooms. The fan size and location should be such that the air inlet to the engine doesn't exceed 120°F when running at full rated load.

Vent sizes depend on variable conditions: (1) size of enclosure, (2) ambient temperature, (3) electrical load, (4) running time, (5) restrictions imposed by screens, louvers, shutters, or filters, (6) prevailing wind direction. *Remember that a required volume of air must reach the unit, absorb the heat, and be discharged away from the installation.* Pressure cooled units need an inlet vent with an unrestricted opening of at least 5 sq. ft. for variables. For discharged air, install separate duct from the engine.

1. The engine discharge duct must be the same size as the inlet vent. If a screen is used in the duct, increase the duct size in proportion to the restriction. Consider installing the screen diagonally to limit the restriction and increase duct size for runs over 9 feet. If bends are necessary, use larger radius elbows. Use a canvas section at the plant to absorb vibration (Fig. 2). To minimize vapor lock, pitch the duct upward (toward the outlet) so heat can escape when unit is shut down.

*Vacu-Flo Cooling Inlet Vent* (see specifications for air flow). should be at least 1 sq. ft., the duct for discharged air should be at least as large as the scroll outlet.

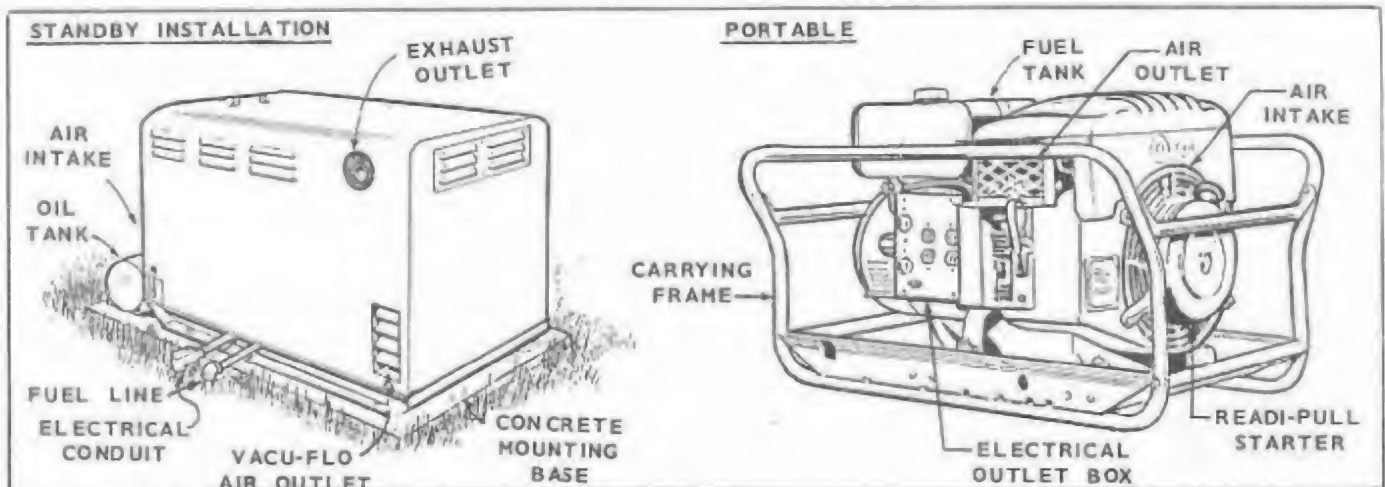
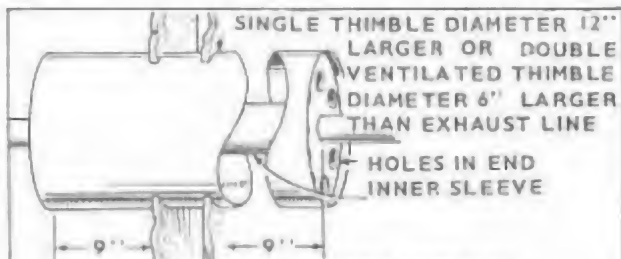


FIGURE 1. MOUNTING



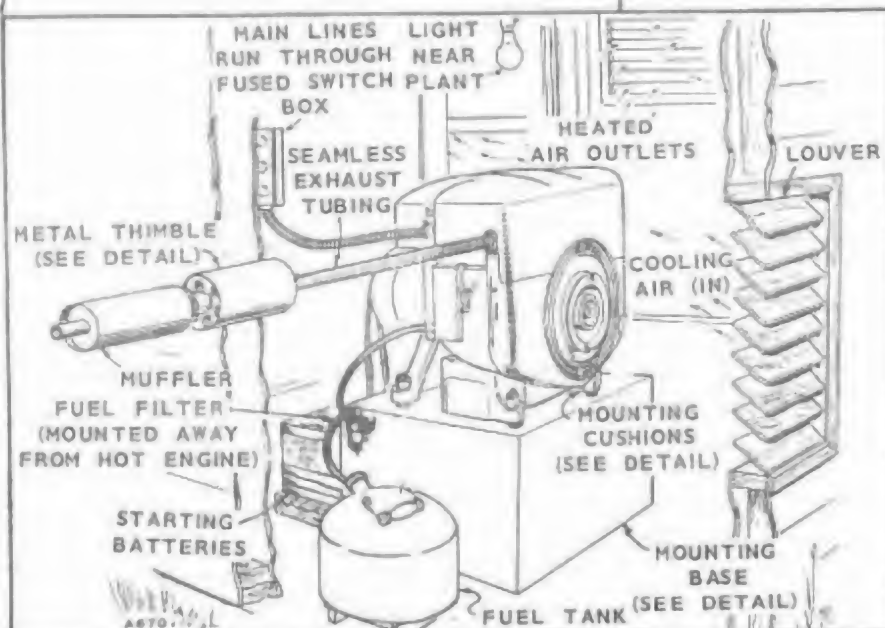
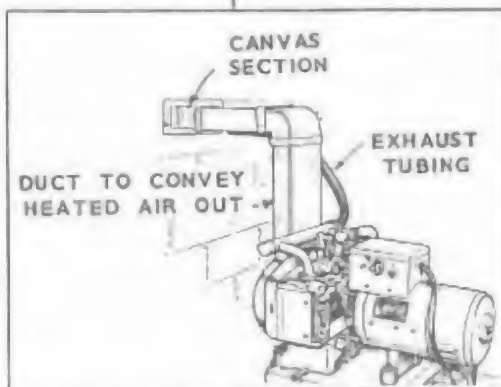
EXHAUST LINE PASSING THROUGH  
WALL OR PARTITION

IF EXHAUST LINE MUST BE PITCHED  
UPWARD CONSTRUCT A TRAP OF PIPE  
FITTINGS AT POINT OF RISE



DRAIN CONDENSATION TRAP  
PERIODICALLY

[AVOID SHARP BENDS]



## COOLING AIR

Pressure cooled plants require an air inlet opening and an air outlet of 5 sq. ft. Position the outlet opening above and to the rear of the plant, the inlet opening just opposite the blower housing.

## VACU-FLO COOLING

Air flow through Vacu-Flo units is reversed. Provide an air inlet of at least 1 sq. ft. Duct the heated air outside. An optional automatic air shutter and air duct is available for use in cold weather.

## WARNING

*Do not use discharged Vacu-Flo air for heating since it may contain poisonous gases.*

## EXHAUST

## WARNING

*Plan the exhaust system carefully. Exhaust gases are poisonous!*

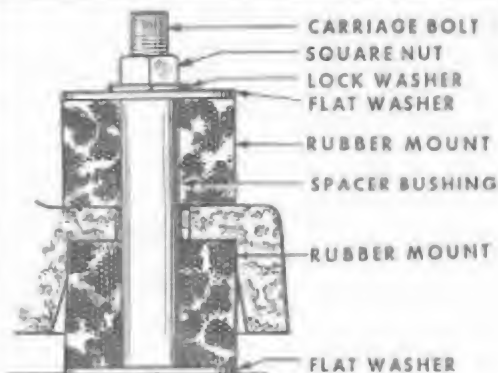
Vent exhaust gases outside. Use flexible tubing between the plant exhaust outlet and rigid piping. Shield the line if it passes through a combustible wall or partition. Where the system leaves the building, install a thimble. If turns are necessary, use long sweep-type elbows. Use one pipe size larger for each ten feet in length. Position the exhaust outlet away from the plant air intake.

## LOCATION

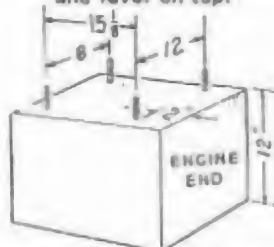
Provide a protected location that is dry, dust-free, and preferably heated in cold weather. For service convenience, provide at least 24" clearance around plant.

## OIL DRAIN

For convenience in draining oil, remove the oil drain plug and install an extension pipe and coupling.



Be sure base is smooth  
and level on top.



Locate base to allow at least  
24" space on all sides.

FIGURE 2. INSTALLATION

Thermostatically controlled shutters can be used to speed warm up after starting and keep cold air out during shut-down. When the discharged air reaches 120°F, shutters begin to open; at 140°F, the shutters are completely open. Air shutters are equipped with a high temperature cut-off switch that stops the plant if duct temperature reaches 240°F  $\pm$  6°. The unit cannot be re-started until the switch temperature drops to 195°F  $\pm$  8°.

### FUEL CONNECTION

For gasoline fueled plants, connect the fuel line to the fuel pump inlet. Pump is threaded 1/8-27 NPTF (National Pipe Thread Female).

**IMPORTANT:** Connect the plant to the fuel source with a flexible line to avoid line failure due to vibration.

For gaseous-fueled plants (see Figure 3), check with the local fuel supplier for gas regulations and line pressure. Provide a manual gas shutoff. A filter in the line may also be necessary. Electric solenoid shut-off valves in the supply line are usually required for indoor automatic or remote starting installations. Connect solenoid wires to

battery ignition circuit (Figure 3) to open valve while the unit is running. Also install a demand type gas regulator according to instructions and position it near the plant to aid starting (regulator line pressure must be within 2 to 8 oz.).

**NOTE:** Always use flexible tubing between engine and the gas demand regulator.

### GASOLINE TANK

If a separate fuel tank is used, install the tank so the bottom is less than 4 feet below the fuel pump. The tank top must be below fuel pump level to prevent siphoning. Install a shut-off valve at the tank. When the fuel tank is shared with another engine, use a separate fuel line for each to avoid starving the plant.

If fuel lift must exceed 4 feet, install an auxiliary electric fuel pump at the fuel supply. Wire it in parallel with the ignition coil (ahead of resistor). If an auxiliary reservoir fuel tank is used for a standby installation, note that fuel line connections must be changed (Fig. 4).

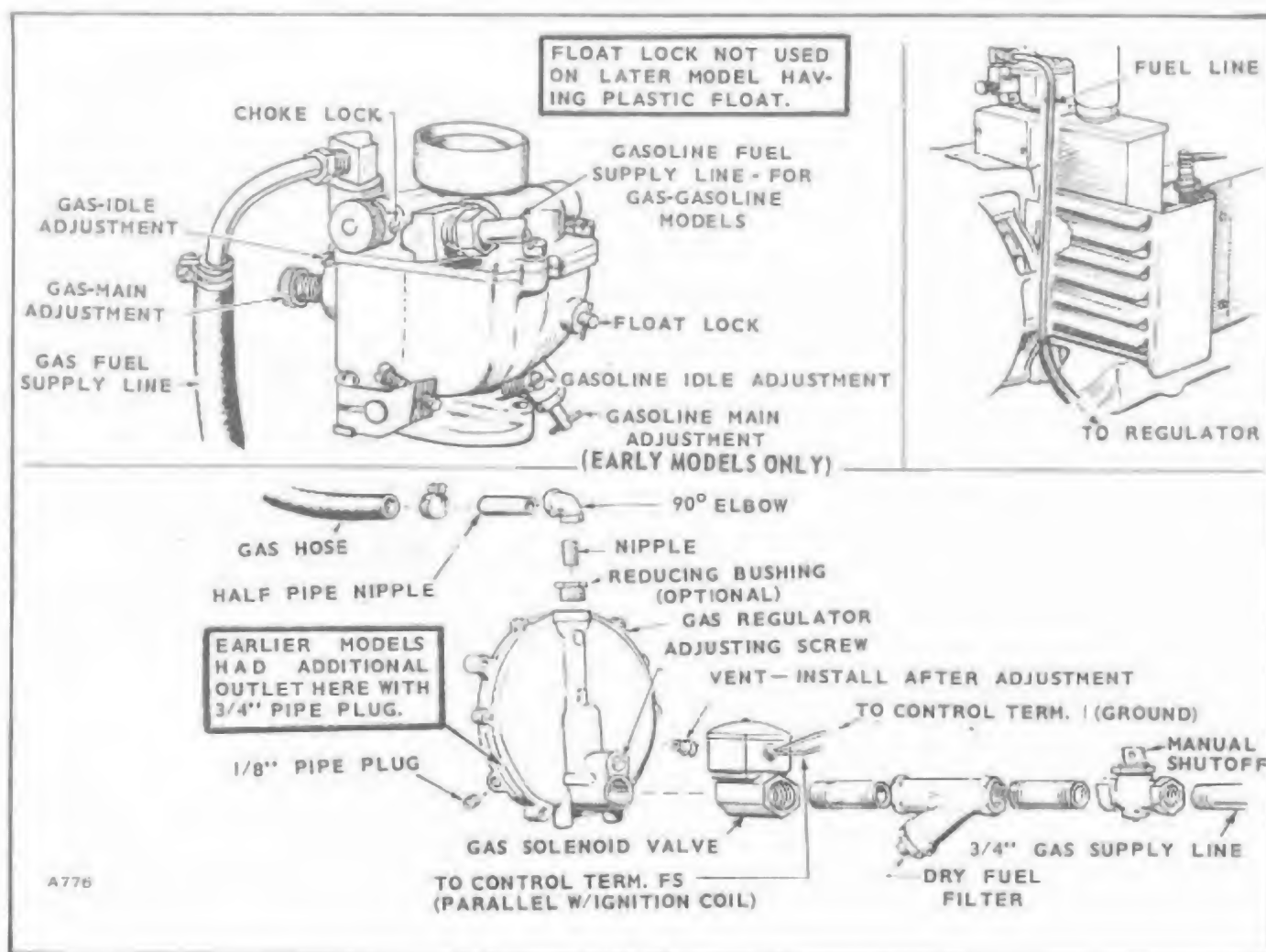


FIGURE 3. FUEL SYSTEM

*Jumpers*  
*Jumpers*

# 1+2 = START  
# 1+3 = STOP

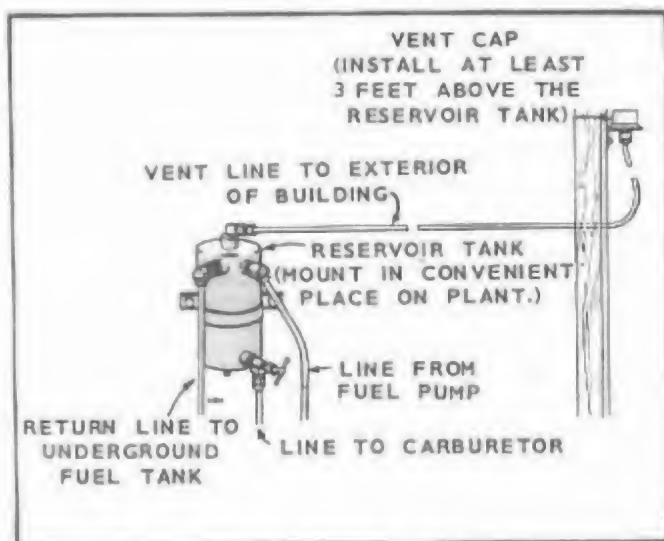


FIGURE 4. FUEL SYSTEM

#### GROUNDING

##### WARNING

To prevent shock hazard, ground the plant. Connect a #8 or larger wire between: (1) a separate ground pipe or rod penetrating into moist earth; (2) and the solderless connector located on the generator (on models not so equipped, to the battery ground stud on the engine).

#### REMOTE START-STOP SWITCH (OPTIONAL)

For remote control starting and stopping, use 3 wires to connect the remote switch (SPDT, momentary contact, center-off type) to the terminal block marked B+, 1, 2, 3, in the plant control box using wire sizes as listed in Fig. 5.

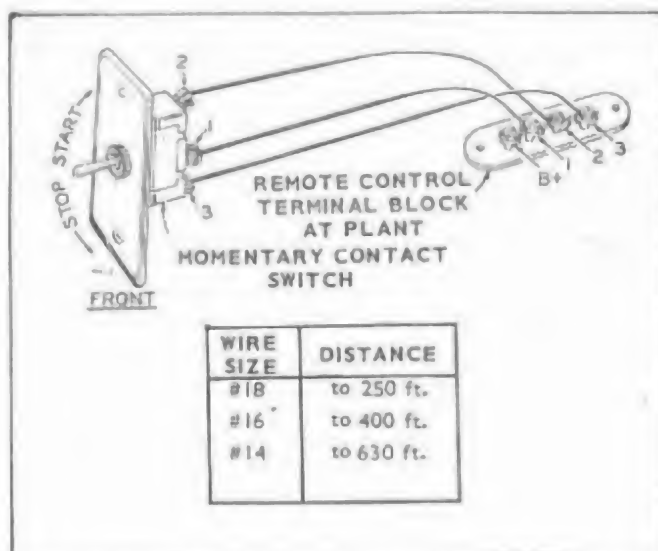


FIGURE 5. REMOTE CONTROL WIRING

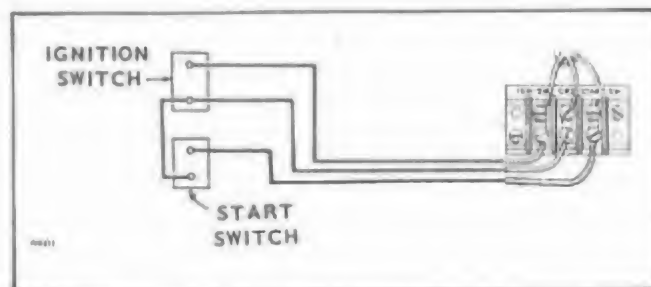


FIGURE 6. START AND IGNITION SWITCHES

#### START AND IGNITION SWITCHES (MAGNET SERVICE PLANTS)

Separate ignition toggle and start push button switches are supplied. These switches can be mounted at any convenient point where the operator will be able to know when the plant starts.

##### CAUTION

Accidental closing of the start switch while the plant is running may damage the starter. Refer to Figure 6 for installation connections.

#### BATTERY CONNECTION

Plant with Starting Motor: (Magnet Service Plants) See Specifications for minimum 12 volt battery requirements. Connect battery positive (+) to starter engaging solenoid terminal post, Fig. 7. Connect battery negative (-) to a good ground on the engine.

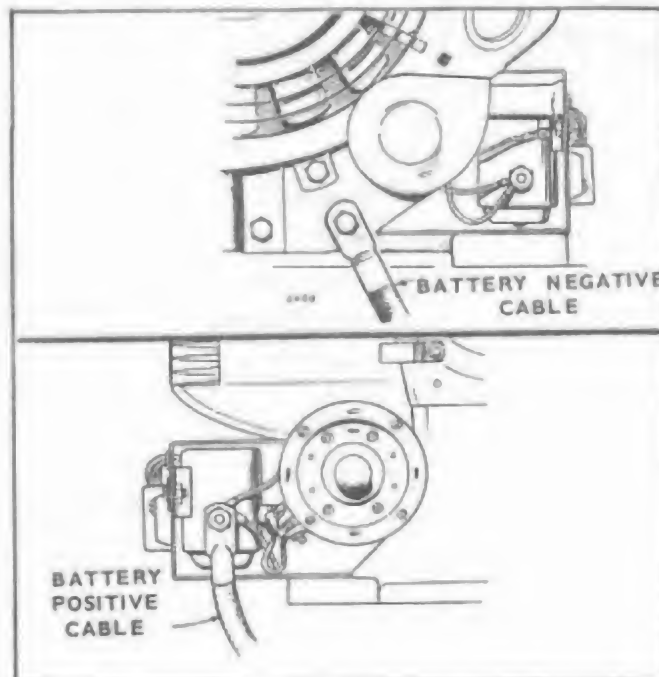


FIGURE 7. BATTERY CONNECTIONS

## BATTERY CONNECTION

**Exciter Cranked Plant:** Refer to wiring diagram and Fig. 8. If battery ground must be changed, reverse the connections to the charge mmeter or re-mark the correct direction of charge. Crank electrically to flash field.

Provide two 6 volt batteries connected in series (one battery's negative to other battery's positive) for a 12 volt source. See Specifications for minimum battery requirements. Connect the remaining battery positive (+) to the start solenoid (located in the control box). Connect the battery negative (-) to a good ground on the generator.

## LOAD WIRE CONNECTIONS

Plant nameplate shows the electrical output rating of the plant in watts, volts, and hertz. The plant wiring diagram shows the electrical circuits and connections necessary for the available output voltage. Also see Fig. 9 thru 12.

Meet all applicable electrical code requirements. Work should be done by a qualified serviceman or electrician because the installation will be inspected and approved.

The plant control box (junction box) has knock out sections to accommodate load wires. Use flexible conduit and stranded load wires near the plant to absorb vibration. Use sufficiently large insulated wires. Strip insulation from wire ends as necessary for clean connections. Connect each load wire to the proper generator output lead or terminal lug inside the plant box. Insulate bare ends of ungrounded wires. Use a bolt (through the control box) to connect the grounded (#) generator lead and load wire. Install a fused main switch (or circuit breaker) between the generating plant and load. If a test run indicates wrong rotation of 3 phase motors in the load circuit, switch the connections at any two generator terminals.

**Standby:** If the installation is for standby service, install a double-throw transfer switch (either manual or automatic) to prevent feeding generator output into the normal power source lines and to also prevent commercial power and generator output from being connected to the load at the same time. Instructions for connecting an automatic load transfer switch are included with such equipment.

**Belonging the Load:** Current for any one output lead must not exceed nameplate rating. Serious overloading can damage the generator windings. When two or more single phase circuits are available, divide the load equally between them. To determine the amount of current available on each single phase circuit, subtract the higher voltage load or 3 phase load (whichever applies) from the rated output and divide the remainder by the quantity of single phase circuits. **EXAMPLE:** On a 5,000 watt, 3 phase, 4 wire plant, if 2,000 watts of 3 phase is used,....a remainder of 3,000 watts is available to be equally divided between the three single phase circuits.

**Output Lead Markings:** Revolving armature generator leads are marked M1, M2, etc. These identifying marks also appear on the wiring diagram.

**Voltage Selection on Reconnectable Single Phase Generators:** Models 4.0CCK-3CR and 5.0CCK-3CR are reconnectable for use as 120/240 volt 3 wire, 120 volt 2 wire, or 240-volt 2-wire, or 240 volt 3-wire power source (Fig.

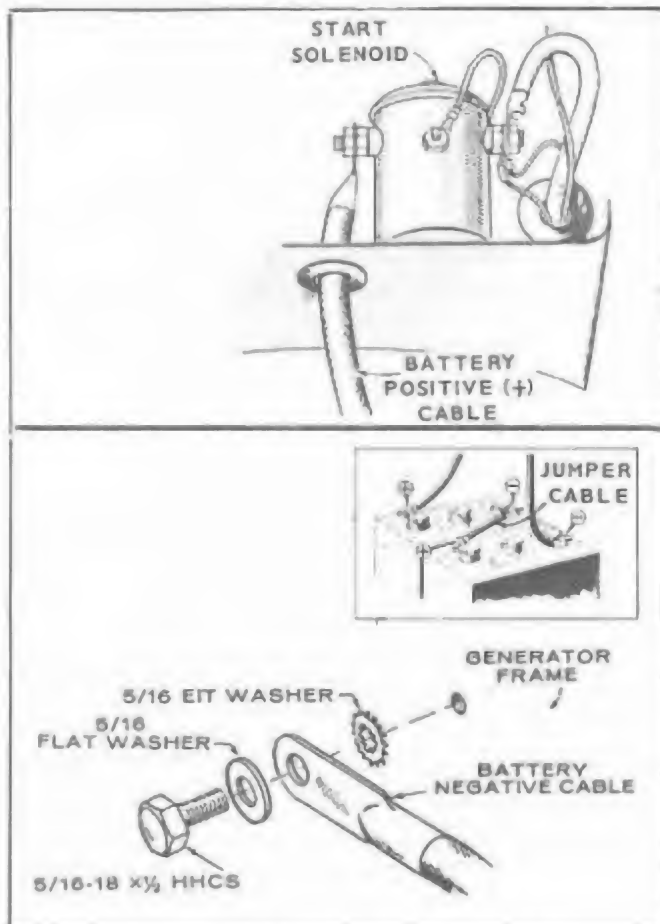


FIGURE 8. BATTERY CONNECTIONS

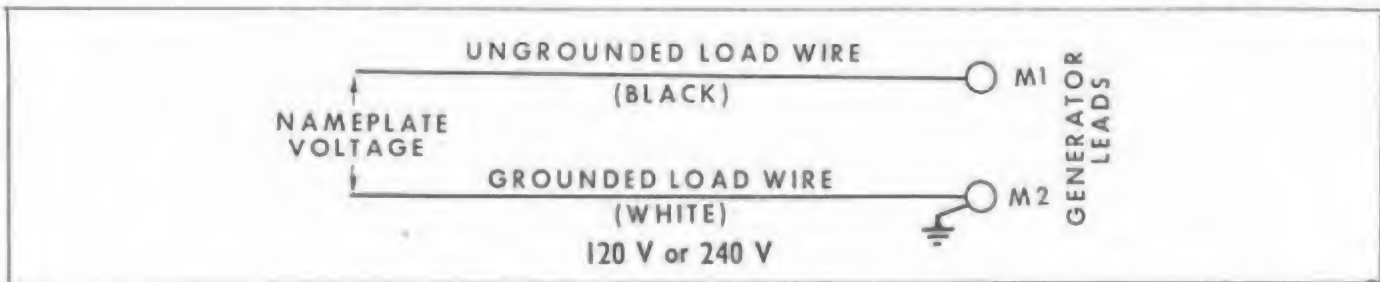


FIGURE 9.

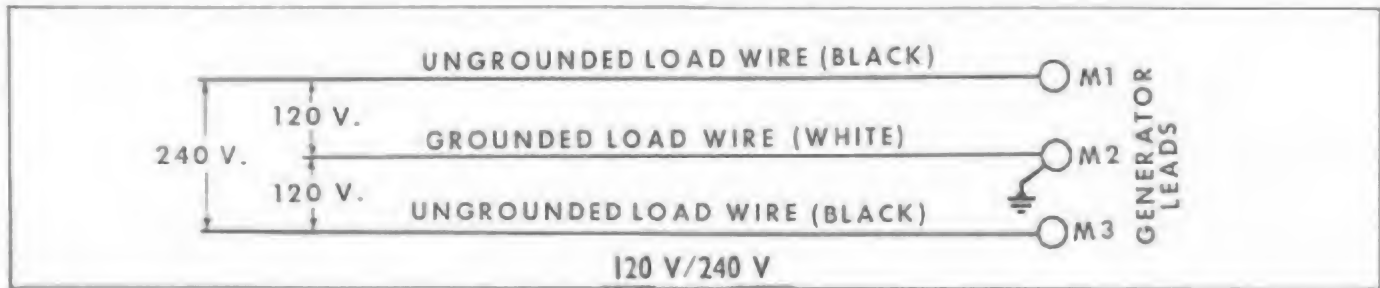


FIGURE 10.

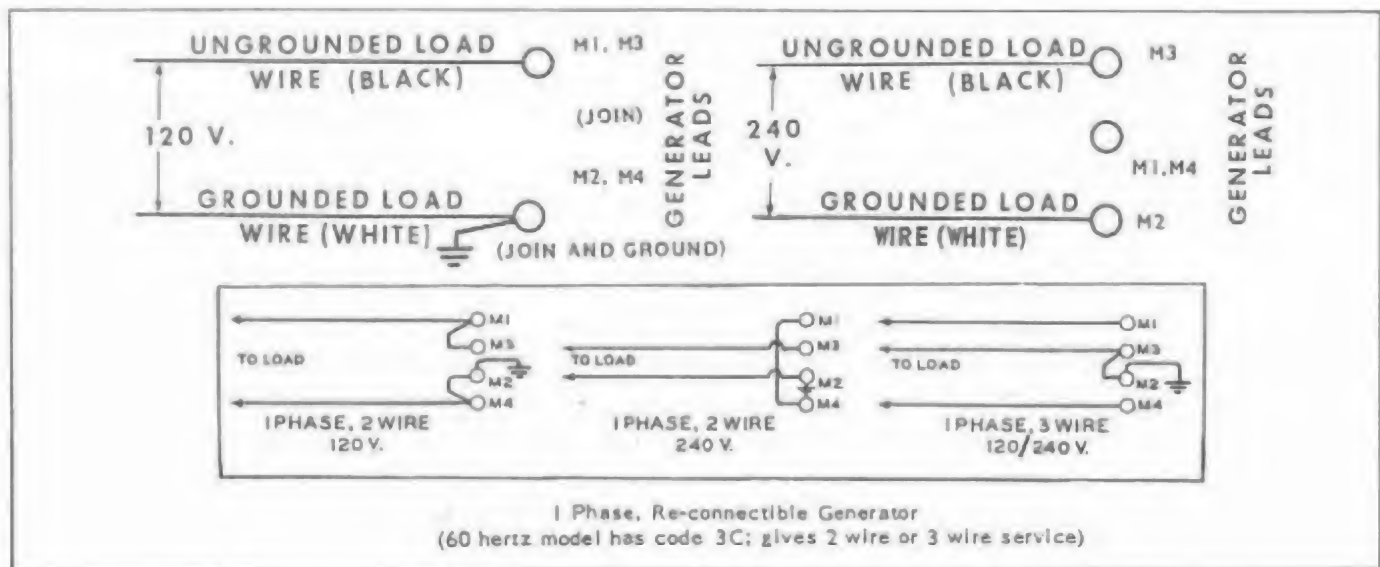


FIGURE 11.

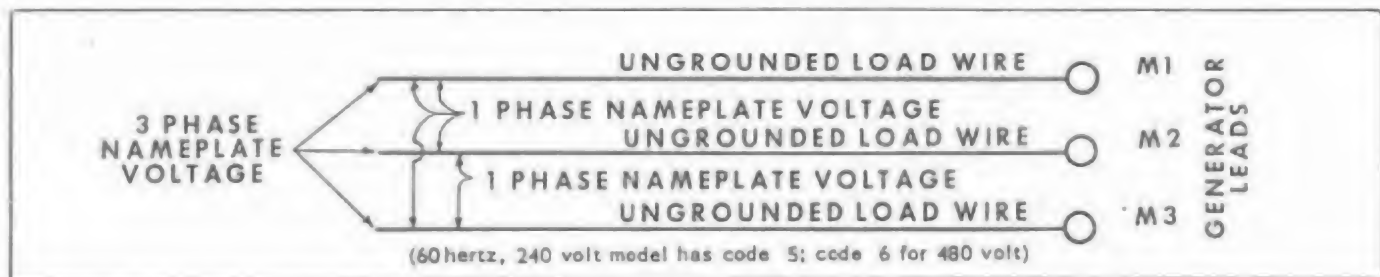


FIGURE 12. LOAD CONNECTIONS

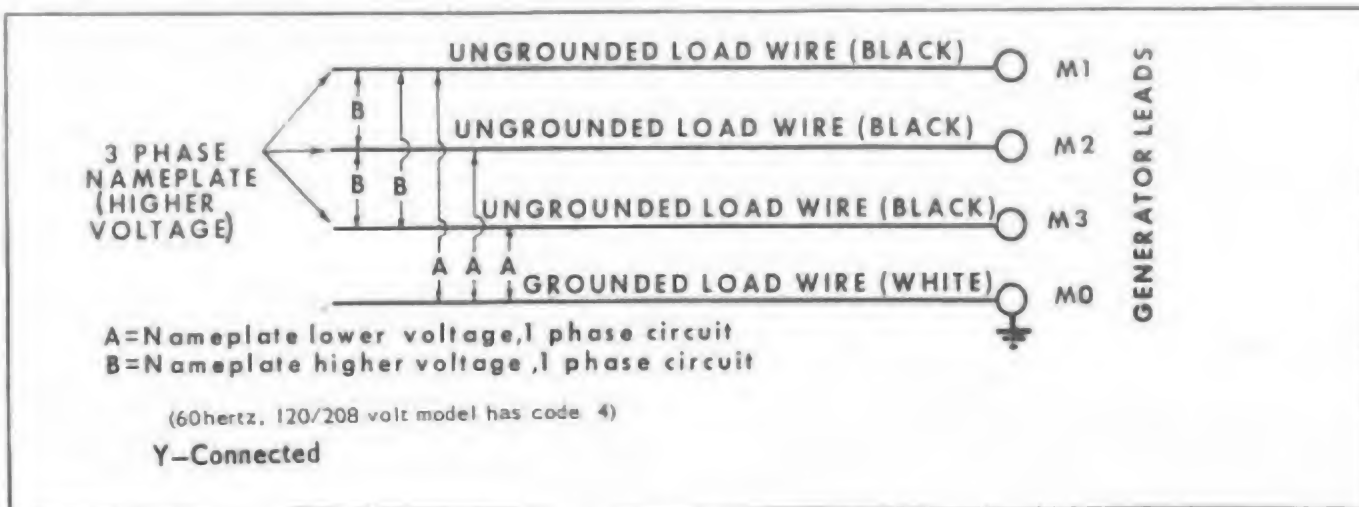


FIGURE 12A. LOAD CONNECTIONS

11). Use the connection for two wire service when one load exceeds 1/2 the rated capacity. Balance the load when connected for three wire service.

**Load Connections:** Refer to the figure which illustrates the load connection for the output shown on your plant's nameplate. See switchboard instructions here when a switchboard is used.

**Load Connections: (Magnet Service)** The magnet service plant, has generator leads marked A1, F2, and A2 extending into the outlet box. Connect the voltage control rheostat

between leads F2 and A2. Connect the magnet (load) wires to generator loads A1 and A2.

**Switchboard:** When an optional wall mounted switchboard containing ammeters, voltmeters, circuit breakers, is used, these load wire connections apply: Connect to the unused terminal of each ammeter, one ungrounded (hot) generator lead. Connect to the ground stud in the switchboard, generator leads and load wires which are to be grounded - if any. Connect to the unused terminal of each circuit breaker, one ungrounded (hot) load wire. On plants which generate more than one voltage, the voltmeter reads the higher voltage shown on the nameplate. The lower voltage is correct when the higher voltage is correct.

# OPERATION

## INITIAL START

Check the engine to make sure it has been filled with oil and fuel. If engine fails to start at first attempt, inhibitor oil used at the factory may have fouled the spark plugs - remove, clean in suitable solvent, dry thoroughly and install. Heavy exhaust smoke when the engine is first started is normal and is caused by the inhibitor oil.

**Crankcase Oil:** Use a good quality heavy-duty detergent oil that meets the API (American Petroleum Institute) service designations MS, MS/DG, MS/DM, SE, or SE/CC. Oil should be labeled as having passed the MS Sequence Tests and the MIL-L-2104B Tests. Recommended SAE oil numbers for expected ambient temperatures are as follows:

Above 90°F	SAE 50
30°F to 90°F	SAE 30
0°F to 30°F	SAE 10W-30, 5W-30
Below 0°F	SAE 5W-30

Do not mix brands or grades. Refer to Maintenance Section for recommended oil changes and complete lubricating oil recommendations.

**Recommended Fuel:** Use clean, fresh, regular grade, automotive gasoline. Do not use highly leaded premium types. For new engines, most satisfactory results can be obtained by using unleaded gasoline. For older engines that have previously used leaded gasoline, heads must be taken off and all lead deposits removed from engine before switching to unleaded gasoline.

### CAUTION

*If lead deposits are not removed from engine before switching from leaded to unleaded gasoline, pre-ignition could occur causing severe damage to the engine.*

### WARNING

*Never fill the tank when the engine is running. Leave some tank space for fuel expansion.*

## ELECTRIC STARTING

**Remote Control, AC Plant:** Push the *start-stop* switch to its *start* position. Release the switch as soon as the plant starts.

**Magnet Service Plant:** Set the *ignition* switch to its on position. Push the *start* switch to crank the engine. Release the start switch as soon as the plant starts.

## MANUAL STARTING

**Manual or Portable Plants:** Adjust the manual carburetor choke as necessary for the temperature conditions. Pull the start rope with a fast, steady pull to crank the engine. Do not jerk. As the plant warms up, adjust the choke gradually to its fully open position.

**Remote Control, AC Plant:** If the battery charge condition is too low to crank the engine, but is sufficient to supply ignition current, the plant can be started manually. Set the control box switch to its *manual* start position. Pull the rope with a fast, steady pull to crank the engine. Do not jerk. After starting, return the control box switch to the *electric start* position, to avoid discharging the battery.

## APPLYING LOAD

### CAUTION

*If practicable, allow plant to warm up before connecting a heavy load. Continuous generator overloading may cause high operating temperatures that can damage the windings. Keep the load within nameplate rating.*

## RHEOSTAT CONTROL, MAGNET SERVICE

Be sure the field rheostat is turned to its maximum resistance position (minimum generator voltage) before starting the plant. After connecting the magnet by operating the magnet controller, adjust the rheostat to give a generator voltage of 250 volts, or to the rated voltage of the magnet. When first connected, the magnet resistance is comparatively low, so more rheostat resistance is needed to keep the voltage at the proper value. As the magnet warms up in use, the rheostat must be re-adjusted to bring the voltage up to normal.

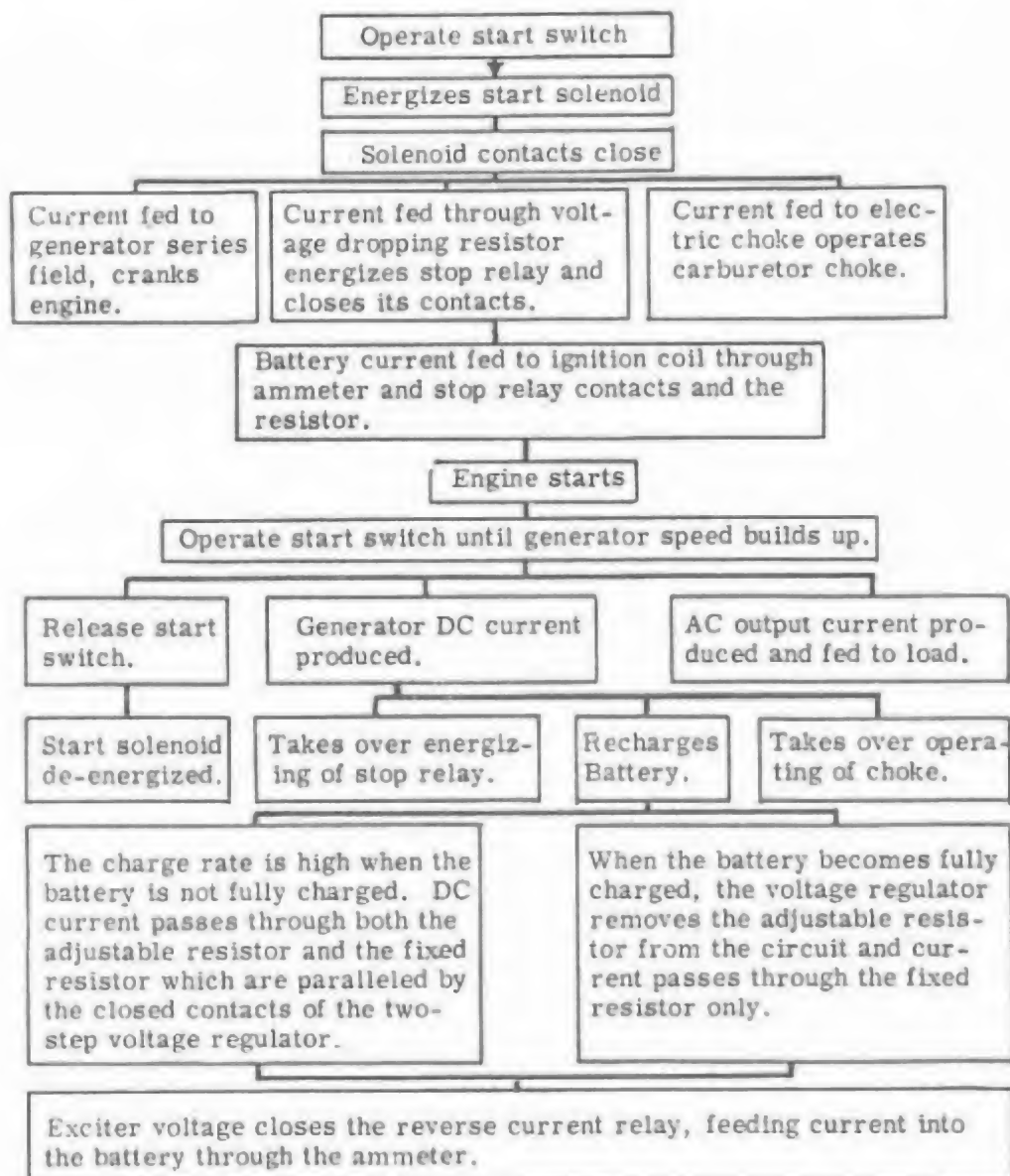


FIGURE 13. SEQUENCE OF OPERATION

## BATTERY CHARGING

The battery charge rate is automatically controlled by a voltage regulator. On AC plants, the high charge rate was set at the factory for average operating conditions. If frequent starts and short operating periods require an increased high charge rate, adjust by moving the slide clip on the adjustable resistor in the control box. On plants with a separate charging generator, failure of charge current could be due to a blown fuse in the voltage regulator.

## DUAL PURPOSE PLANT:

The charging rate to the battery is controlled by a *Hi-Lo* charge switch located near the ammeter on the plant control box. When this switch is at the *Hi* position, the charging rate is about 20 amperes. When the switch is at the *Lo* position, the charging rate is about 3 amperes.

The total AC load on the dual purpose plant should not exceed 2250 watts when the charge switch is at the *Hi* position. When the charge switch is at the *Lo* position, the full ac capacity of 3,000 watts can be used.

The plant produces alternating current (ac) as well as direct current (dc) and must operate at about 1800 rpm (for 60 hertz plants) in order to produce the correct frequency. *Never increase engine speed to increase the charging rate.* Engine speed should be adjusted only as necessary to obtain the correct ac output frequency.

### GAS-GASOLINE CONVERSION

Engines having a combination gas-gasoline carburetor can be switched to gasoline operation by the following procedure: (1) Close the manual fuel shut-off valve in supply line for natural gas or Propane-Butane vapor, wherever located; (2) Open the gasoline fuel shut-off valve, wherever located; (3) Unscrew the carburetor float lock (early models only) all the way outward to backseat (necessary to prevent leakage); (4) Set the spark plug gap as given in the Table of Clearances; (5) See that the choke is free and works easily (be sure to release choke lock on plants with electric choke); (6) Start the engine in the manner described for the engine. If the engine runs unevenly under half or full load, due to faulty carburetor adjustment, the main jet needs adjusting. This is not the same main-adjusting screw used for gaseous fuel. Another adjusting screw is provided for this purpose (refer to Adjustment Section).

To change back to natural or Propane-Butane operation, reverse the above procedure and reset the spark plug gap.

### PLANT EXERCISE

Infrequent use results in hard starting. Operate plant one 30 minute period each week. Run longer if battery needs charging. Exercising for one long period each week is better than several short periods.

### EMERGENCY OPERATION IF BATTERY FAILS

The remote-type revolving-armature plant needs a battery for electric choke and ignition. If the battery fails completely and the plant must be operated during an emergency, a battery can be shared with other equipment provided the plant charging circuit is disconnected as follows: Remove the wire which connects to the battery terminal on the reverse current relay from the ammeter and tape the bare end. With this lead disconnected, the plant will not recharge battery.

### BREAK-IN PROCEDURE

The unit should be run in the following sequence using MS/DG, DM, SE or SE/CC oil (see oil requirements for correct viscosity).

1. One half hour at half load.
2. One half hour at three quarter load.
3. Full load.

This method of load application speeds piston ring seating. Continuous running at half (light) load for the first few hundred hours usually results in poor piston ring seating, causing higher than normal oil consumption and blowby.

### OUT-OF-SERVICE PROTECTION

Protect a plant that is to be out-of-service for more than 30 days as follows:

1. Run plant until thoroughly warm.
2. Turn off fuel supply and run until plant stops.
3. Drain oil from oil base while still warm. Refill and attach a warning tag stating oil viscosity used.
4. Remove each spark plug. Pour 1 oz. (two tablespoons) of rust inhibitor (or SAE #50 oil) into each cylinder. Crank engine slowly (by hand) several times. Install spark plugs.
5. Service air cleaner.
6. Plug exhaust outlet to prevent entrance of moisture, dirt, bugs, etc.
7. Wipe generator brushes, slip rings, etc. Do not apply lubricant or preservative.
8. Provide a suitable cover for the entire unit.
9. If battery is used, disconnect and follow standard battery storage procedure.

### HIGH TEMPERATURES

1. See that nothing obstructs air flow to-and-from the plant.
2. Keep cooling fins clean. Air housing should be properly installed and undamaged.
3. Keep ignition timing properly adjusted.

### LOW TEMPERATURES

1. Use correct SAE No. oil for temperature conditions. Change oil only when engine is warm. If an unexpected temperature drop causes an emergency, move the plant to a warm location or apply heated air (do not use open flame) externally until oil flows freely.

2. Use fresh (not *premium*) gasoline. Protect against moisture condensation. Below 00F adjust carburetor main jet for slightly richer fuel mixture.
3. Keep ignition system clean, properly adjusted, and batteries in a well charged condition.
4. Partially restrict cool air flow but use care to avoid overheating.

#### DUSTY AND DIRTY

1. Keep plant clean. Keep cooling surfaces clean.
2. Service air cleaner as frequently as necessary.
3. Change crankcase oil every 50 operating hours.
4. Keep oil and gasoline in dust-tight containers.
5. Keep governor linkage clean.
6. Clean generator brushes, slip rings, and commutator - do not remove normal (dark brown) film. Do not polish.

#### HIGH ALTITUDE

For operation at altitudes of 2500 feet above sea level, close carburetor main jet adjustment slightly to maintain proper air-to-fuel ratio (refer to the *Adjustments Section*). Maximum power will be reduced approximately 4% for each 1000 feet above sea level, after the first 1000 feet.

# ADJUSTMENTS

## BREAKER POINTS

Replace burned or faulty points. If only slightly burned, dress smooth with file or fine stone. Measure gap with thickness gauge. Set point gap at .020 inch.

Ignition breaker points (Figure 14) must be correctly gapped. Crank the engine to fully open breaker points (1/4 turn after top center). Loosen and move the stationary contact to correct the gap at full point separation. Secure points and check for correct gap.

Ignition points should break contact just when the 19° timing mark aligns with the flywheel timing mark. Final timing is corrected by shifting the breaker point box on its mounting base and using a timing light.

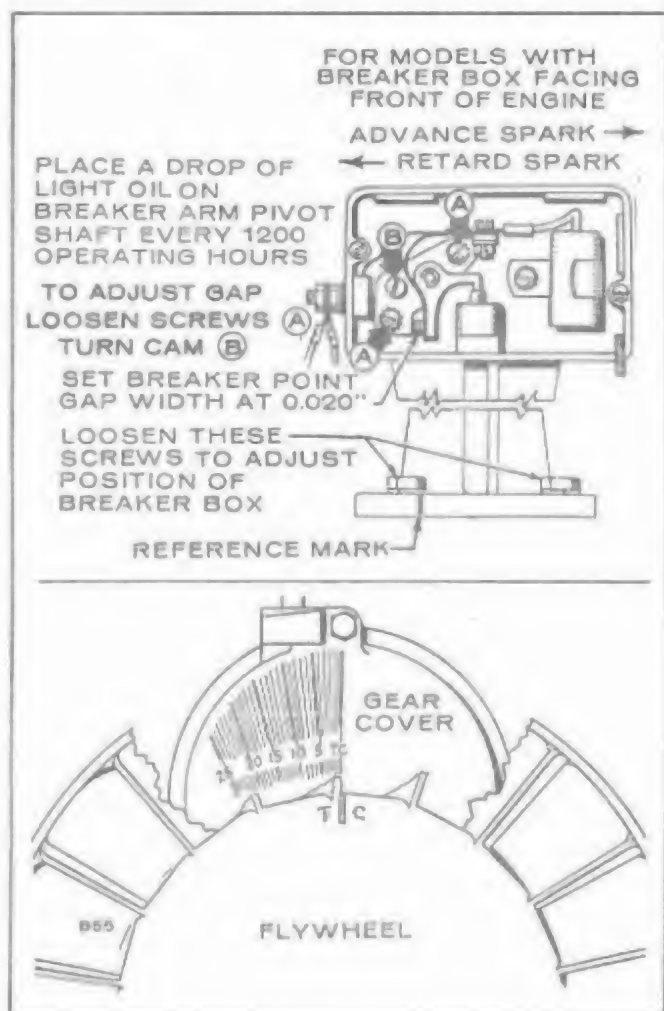


FIGURE 14. IGNITION POINTS

## CARBURETOR

The carburetor has an adjustable idling jet. It is simple in construction and normally requires little attention other than a periodic cleaning. If the engine runs unevenly at half or full load due to faulty carburetion, the main adjusting needle (early models only) needs adjusting. Make the adjustment while the engine is running at normal operating temperature and with almost a full load connected to the generator.

Turn the main adjusting needle (early models only) out about two full turns. Then turn it slowly in until the engine begins to lose power and speed. Then turn it out very slowly until

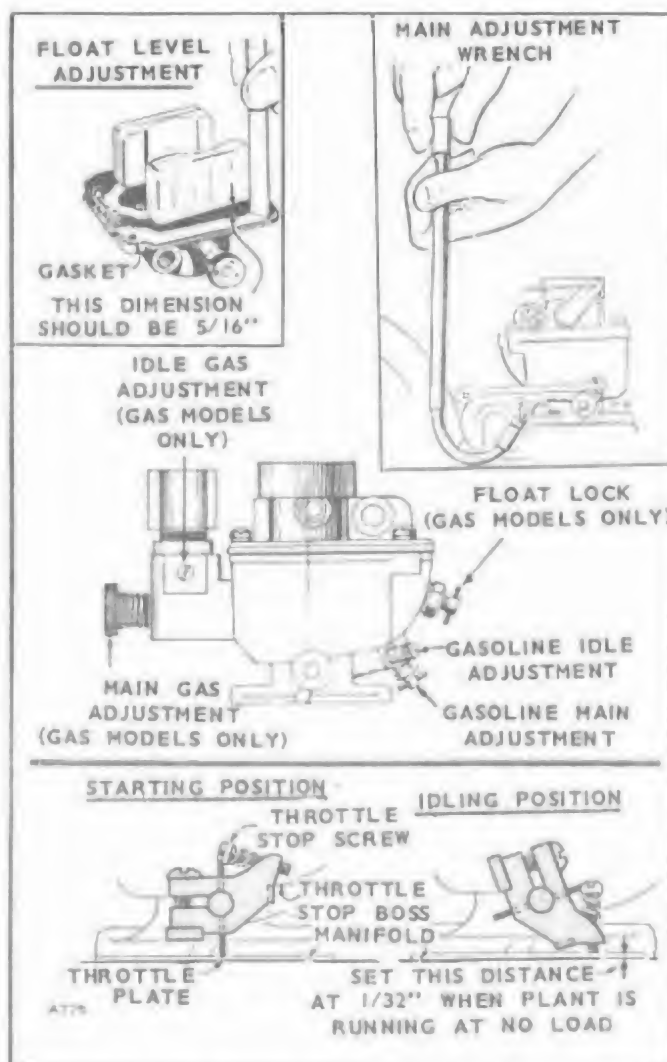


FIGURE 15. CARBURETOR ADJUSTMENTS

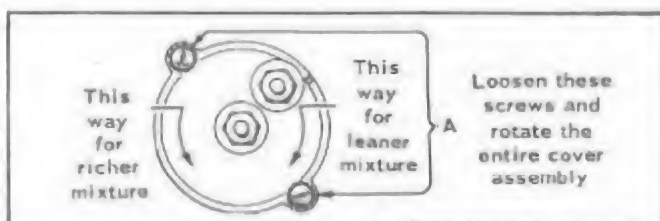


FIGURE 16. CHOKE ADJUSTMENT

the engine runs smoothly at full power and speed. Onan carburetor wrench (420B169) can be purchased from your Onan dealer for easier adjustment of the carburetor engine adjusting needle.

When adjusting the idle jet needle, the engine should be running at normal operating temperature and without a load

connected. Turn the idle adjusting needle in until the engine loses considerable speed. Then turn it out until the engine runs smoothly. A hunting condition at no load can sometimes be corrected by an idle adjustment.

If the engine develops a hunting condition (alternate increase and decrease of engine speed) try correcting by opening the main adjusting needle (early models only) a little more. Do not open more than  $1/2$  turn beyond the maximum point of power. If this does not correct the condition, the sensitivity adjustment of the governor should be adjusted.

To adjust the carburetor float level, bend the float near the shaft as needed to obtain the correct level.

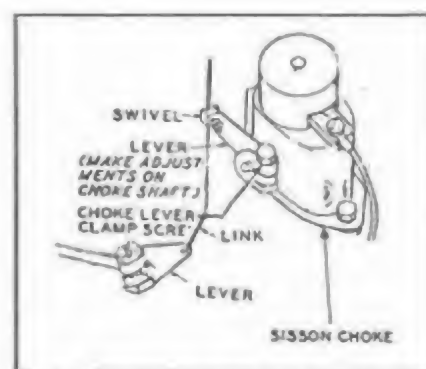
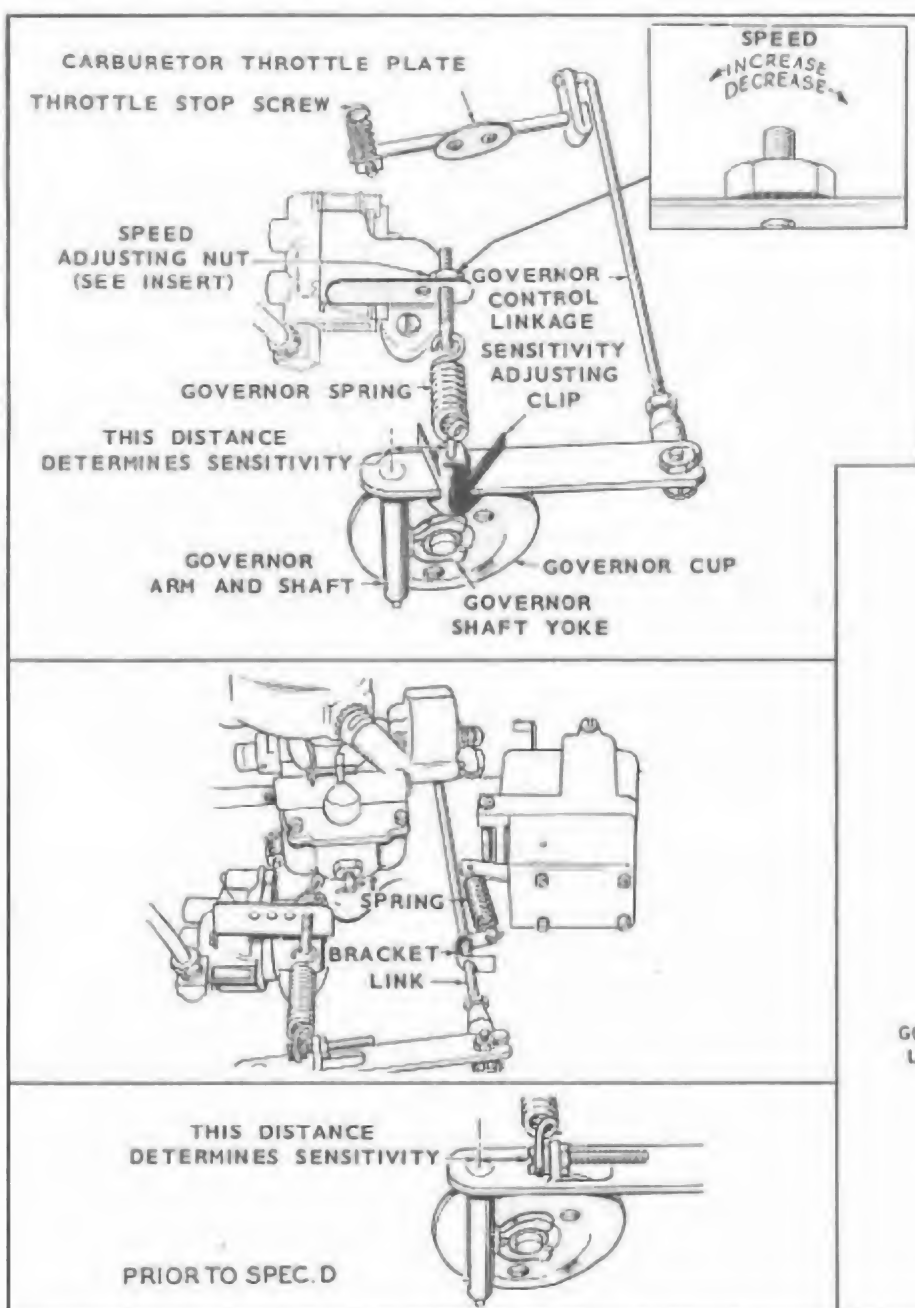


FIGURE 17. SISSON CHOKE

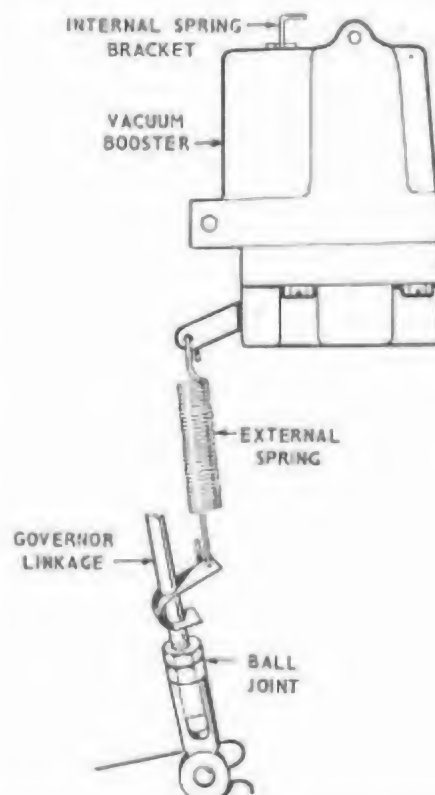


FIGURE 18. GOVERNOR ADJUSTMENTS

**Gas Fuel:** When operating on gas fuel, follow the procedure given for gasoline fuel, using the gas fuel adjusting screws. Always be sure the carburetor choke is locked in its wide open position.

### ELECTRIC CHOKE

If extremes in starting temperatures require a re-adjustment of the choke, loosen slightly the two cover retaining screws. For less choking action, turn the cover assembly a few degrees in a clockwise direction. For more choking action, turn counterclockwise. Retighten the cover screws.

### SHOCK CHOKE (Figure 17)

This choke should not require any seasonal re-adjustment. If adjustment becomes necessary, pull choke lever up and insert a 1/16" diameter rod through shaft hole (opposite end from lever) and engage rod in notch of mounting flange, to lock shaft in place.

Loosen choke lever clamp screw. With air inlet removed, adjust choke lever so carburetor choke plate is completely closed, or not more than 5/16" open. Tighten choke lever clamp screw and remove locking rod from shaft.

### GOVERNOR AND BOOSTER

The governor and booster control the speed of the engine. A speed adjustment includes adjusting both devices (Fig. 18).

#### GOVERNOR

Before making final governor adjustments, run the plant about 15 minutes under light load to reach normal operating temperature. (If governor is completely out of adjustment, make a preliminary adjustment at no load to first attain a safe voltage operating range).

On AC generating plants, engine speed determines the output voltage and current frequency of the generator. By increasing the engine speed, generator voltage and frequency are increased, and by decreasing the engine speed, generator voltage and frequency are decreased. An accurate voltmeter or frequency meter (preferable both) should be connected to the generator output in order to correctly adjust the governor of the ac plant. A small speed drop not noticeable without instruments will result in an objectionable voltage drop. The engine speed can be checked with a tachometer.

A binding in the bearings of the governor shaft, in the ball joint, or in the carburetor throttle assembly will cause erratic governor action or alternate increase and decrease in speed (hunting). A lean carburetor adjustment may also cause hunting. Springs of all kinds have a tendency to lose their calibrated tension through fatigue after long usage. If all governor and carburetor adjustments are properly made, and the governor action is still erratic, replacing the spring with a new one and resetting the adjustments will usually correct the trouble.

1. Adjust the carburetor main jet for the best fuel mixture while operating the plant with a full rated load connected.
2. Adjust the carburetor idle needle with no load connected.
3. Adjust the length of the governor linkage and check linkage and throttle shaft for binding or excessive looseness.

4. Adjust the governor spring tension for rated speed at no load operation with booster disconnected (or held inoperative).
5. Adjust the governor sensitivity.
6. Recheck the speed adjustment.
7. Set the carburetor throttle stop screw.
8. Set the vacuum speed-booster.

### VOLTAGE CHART FOR CHECKING GOVERNOR REGULATION

ALTERNATING CURRENT TYPES OF PLANTS	120 VOLT	240 VOLT
	1 PHASE 2 WIRE OR 120/240 V	1 PHASE 2 WIRE OR 240 VOLT
NOTE: Output rating is at UNITY power factor load.	1 PHASE 3 WIRE	3 PHASE 3 WIRE
Maximum No Load Volts	126	252
Minimum Full Load Volts Without Booster	110	220
Maximum Voltage Drop from No Load Operation to Full Load Operation	16	32
Preferred Voltage Regulation, No Load to Full Load Oper- ation	122-118	244-236
Preferred Voltage Spread	5	9

### SPEED CHART FOR CHECKING GOVERNOR REGULATION

ALTERNATING CURRENT TYPES OF PLANTS	FOR ALL 60 HERTZ PLANTS	FOR ALL 50 HERTZ PLANTS
Maximum No Load Speed		
RPM	1920	1620
Hertz (Current Frequency)	64	54
Minimum Full Load Speed Without Booster		
RPM	1710	1500
Hertz	57	50
Maximum Speed Drop from No Load Operation to Full Load Operation		
RPM	90	90
Hertz	3	3
Preferred Speed Regulation, No Load to Full Load Operation		
RPM	1830-1770	1590-1530
Hertz	61-59	53-51
Preferred Speed Spread		
RPM	60	60
Hertz	2	2

### VOLTAGE CHART FOR CHECKING GOVERNOR REGULATION

DIRECT CURRENT TYPES OF PLANTS	115 VOLT DC	250 VOLT DC MAGNET SERVICE
Maximum No Load Volts	120	270
Minimum Full Load Volts Without Booster	110	240
Maximum Voltage Drop from No Load to Full Load	10	30
Preferred Voltage Regulation, No Load to Full Load	120-110	265-245
Preferred Voltage Spread	—	20

### SPEED CHART FOR CHECKING GOVERNOR REGULATION

DIRECT CURRENT TYPES OF PLANTS	115 VOLT DC	250 VOLT DC MAGNET SERVICE
Maximum No Load Speed RPM (Revolutions Per Minute)	2000*	2000**
Minimum Full Load Speed Without Booster RPM	1800*	1800**
Maximum Speed Drop from No Load Operation to Full Load Operation RPM	200	200

**Note \*** - For models prior to Spec D, speed is 2400-2700 rpm.

**Note\*\*** - For Models prior to Spec D, speed is 2500-2750 rpm.

#### LINKAGE

The engine starts at wide open throttle. The length of the linkage connecting the governor arm to the throttle shaft and lever is adjusted by rotating the ball joint. Adjust this length so that with the engine stopped and tension on the governor spring, the stop on the carburetor throttle lever just contacts the underside of the carburetor bowl. This setting allows immediate control by the governor after starting. It also synchronizes travel of the governor arm and the throttle shaft.

#### SPEED ADJUSTMENT

With the warmed-up plant operating at no load, and with the booster external spring disconnected (or otherwise held inactive), adjust the tension of the governor spring. Refer

to Voltage Chart and the Speed Chart and select the column which corresponds to the nameplate of the plant in question. turn the speed adjusting nut to obtain a voltage and speed reading within the limits shown.

#### SENSITIVITY ADJUSTMENT

Refer to the Governor Adjustment illustration, and to the Voltage and Speed Charts. Check the voltage and speed, first with no load connected and again with a full load. Adjust the sensitivity so as to give the closest regulation (least speed and voltage difference between no load and full load) without causing a hunting condition.

To increase sensitivity (closer regulation), shift the adjusting clip toward the governor shaft. On earlier models, prior to spec D, turn the adjusting stud counterclockwise. An adjustment for too much sensitivity will cause alternate increase and decrease of engine speed (hunting).

To decrease sensitivity, shift the adjusting clip toward the outer end of the governor arm. On earlier models, turn the adjusting stud clockwise. Too little sensitivity will result in too much difference in speed between no load and full load conditions.

Any change in the sensitivity adjustment usually requires a compensating speed (spring tension) adjustment.

#### SPEED-BOOSTER

After satisfactory performance under various loads has been attained by governor adjustments without the booster, the booster can be connected. Connect the booster external spring to the bracket on the governor link (rod). With the plant operating at no load, slide the bracket on the governor link just to the position where there is no tension on the external spring (Fig. 18).

Apply a full rated electrical load to the generator. The output voltage should stabilize at nearly the same reading for full load as for no load operation. The speed may remain about the same or increase when the load is applied, resulting in a frequency 1 or 2 hertz *higher than* the no load frequency. (1 hertz is equal to 30 rpm for a 4 pole generator). If the rise in frequency is more than 2 hertz, lessen the internal spring tension. If there is a drop in the frequency, increase the booster internal spring tension. To increase the tension, pull out on the spring bracket, and move the pin to a different hole.

With the booster disconnected, a maximum drop of 3 hertz from no load to full load is normal. With the booster in operation, a maximum *increase* of 2 hertz from no load to full load is normal. A drop of 1 hertz at 1/4 load is permissible, giving an over all spread of 3 hertz, maximum.

The effect of the booster is limited by the general condition of the engine. The booster cannot compensate for a loss in engine vacuum caused by leaky valves, worn piston rings, etc.

---

## SPECIAL UTILITY TRUCK SECTION

---

This section applies specifically to the "Utility Truck" models of the CCK series generating plants. These supplementary instructions are to be used, where they apply, instead of the instructions for the standard generating plants.

For instructions not covered in this section, refer to the appropriate section for the standard plants.

The utility plant is designed to supply 12 volt DC output for radio etc., while the truck is stopped at a service job. At the same time, ac power is available for flood lights, power tools, etc. Thus, the generating plant eliminates the necessity of running the truck engine to prevent battery run down at a service job. The generating plant can also be used to recharge a low truck battery if AC power requirements are sufficiently reduced. In normal operation, the plant supplies DC and AC current for the load, but does not recharge the battery.

The utility plant has a relay, which opens the charging circuit in the generator set when the truck engine is running, to prevent the battery from being charged from both sources at the same time. This is necessary to prevent damage to the reverse current relays in both the truck and generator set charging systems as a result of interaction between them.

### RATED OUTPUT

(Alternating current and direct current are produced at the same time.)

- Combined AC and DC rated output . . . . . 4,000 Watts
- Maximum DC amperes (automatically limited) . . . . . 30 Amps
- Maximum DC watts (maximum 30 amps x nominal 13 volts) . . . . . 390 Watts
- Available AC output (2500 watts less watts of DC charging current)
  - Minimum (while full load dc connected-truck stopped) . . . . . 3,610 Watts
  - Maximum (while truck running or battery charged and no DC load connected) . . . . . 2,500 Watts
- Open circuit DC voltage (12 volt battery charging) . . . . . 15 Volts
- Nominal AC voltage (power for tools, etc.) . . . . . 120 Volts

**IMPORTANT:** Too high a voltage will over-charge and possibly damage the battery. Adjust the governor only to correct the DC voltage output of the generator at operating temperature. If a carburetor adjustment is made, check the governor adjustment also.

*Do not become alarmed if the ammeter reads 45 amperes when first starting the plant. After a few minutes the current will come down to normal as the generator warms up and the battery voltage comes up.*

*Consistently high charge rate (after warm up) could be due to a poor battery in the truck or running the plant too fast.*

Vacu-Flo cooling and remote control starting and stopping make the plant suitable for installation in small compartments.

### CHARGE RATE

Rated DC output is 30 amperes. A circuit breaker opens the charge circuit to protect the generator if DC output is high. Equal time is consumed by the breaker to cut-in and cut-out and it may go through this cycle several times, each succeeding cycle becoming more rapid, until it acts and sounds like a buzzer, during an over-load on the DC output. Generally, the battery will warm up and the charge rate will drop so that the breaker will not reach the buzzing stage.

As the battery reaches a charge condition, its terminal voltage approaches that of the generating plant, resulting in a desirable tapering off charge rate. After the battery becomes fully charged, the charge rate equals the DC load (radio, lights, etc.) connected.

The plant's charge ammeter reads zero while the truck's engine is running.

### AC OVER-LOADING

It is not expected that men on the job will determine available load each time before plugging in tools, etc. Over-loading is apt to occur especially during night work when both lights and tools are used. If the plant speed drops, AC lights will dim, and part of the load must be disconnected. If more AC power is required,

simply run the truck's motor to take over the *DC* load for that interval, and make the full rating available in *AC* output.

A short circuit across the *AC* terminals will collapse the field to protect the generator.

#### GOVERNOR ADJUSTMENT

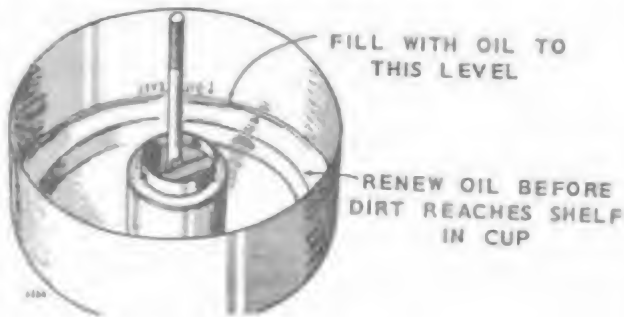
To check or correct the engine speed, a *DC* voltmeter is required, the plant must be warm and, all load disconnected. Proceed as follows:

1. Run plant with full *AC* load connected for at least 1/2 hour to reach operating temperature.

2. With the load alternately removed and connected, adjust the governor sensitivity screw, if necessary, to attain a minimum drop in speed from no-load to full-load operating with no hunting condition.
3. Remove the *AC* load and stop the plant, then disconnect the generator lead A1 at the relay in the plant control.
4. Connect the *DC* voltmeter across lead A1 and ground.
5. Run the plant and adjust the speed to deliver 15 volts *DC*.
6. Remove the voltmeter, reconnect the A1 lead to the relay and replace other parts removed.

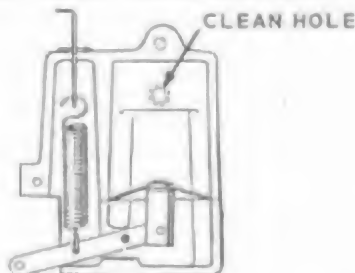
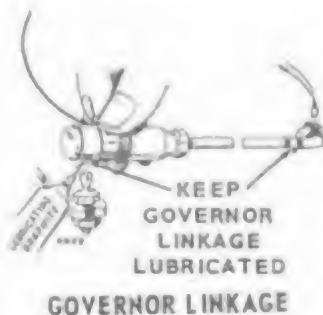
# MAINTENANCE

PERFORM ALL MAINTENANCE DETAILS AS SPECIFIED IN THE MAINTENANCE SCHEDULE



## AIR CLEANER

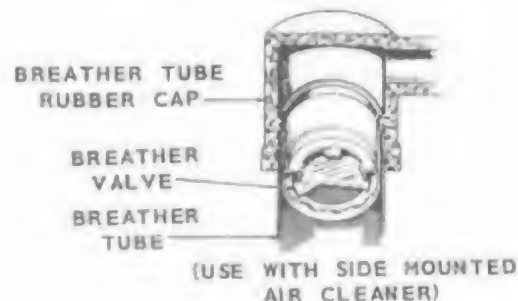
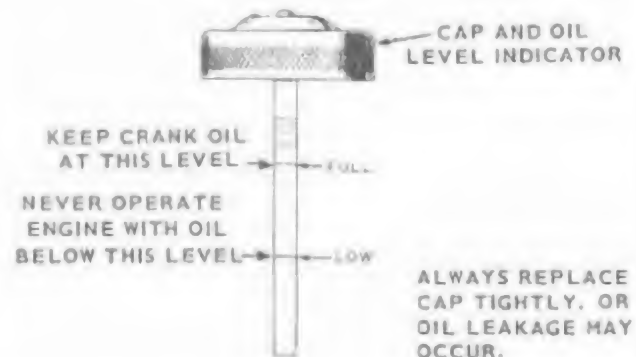
Fill to level indicated on cup. Use the same type of oil as used in crankcase. Contractor model, remove cartridge and shake out accumulated dirt. Do not wash. Install new new cartridge every 500 hours.



## SPEED BOOSTER

Use a fine wire to clean the small hole in the short vacuum tube which fits into the hole in the top of the engine intake manifold. Do not enlarge this hole. If there is tension on the external spring, when the plant is operating at no load or light load, it may be due to improper adjustment, restricted hole in the small vacuum tube, or a leak in the booster diaphragm or gasket.

## OIL LEVEL



## CRANKCASE BREATHER

Lift off rubber breather cap. Carefully pry valve from cap. Otherwise press hard with both of your thumbs on top of cap and fingers below to release valve from rubber cap. Wash this fabric flapper type check valve in a suitable solvent. Dry and install. Position perforated disc toward engine.



**SPARK PLUG GAP**  
0.025" Gasoline  
0.018" Gas

FIGURE 19. GENERAL MAINTENANCE

## FUEL SEDIMENT

Empty carburetor and fuel filter (strainer) bowls of any accumulated sediment. Clean filter screen thoroughly. Reassemble and check for leaks.

## OPERATOR MAINTENANCE SCHEDULE

MAINTENANCE ITEMS	OPERATIONAL HOURS			
	8	50	100	200
Inspect Set Generally	x			
Check Fuel Supply	x			
Check Oil Level	x			
Check Air Cleaner		x1		
Clean Governor Linkage		x1		
Check Spark Plugs			x	
Change Crankcase Oil			x1	
Clean Crankcase Breather				x
Clean Fuel System				x
Check Battery				x

x1 - Perform more often in extremely dusty conditions.

For any abnormalities in operation, unusual noises from engine or generator, loss of power, overheating, etc., contact your ONAN dealer.

## MAINTENANCE SCHEDULE

Use this factory recommended maintenance schedule (based on favorable operating conditions) to serve as a guide to get long and efficient plant life. Neglecting routine maintenance can result in failure or permanent damage to the plant. Maintenance is divided into two categories: (1) *operator maintenance* - performed by the operator and (2) *critical maintenance* performed by qualified service personnel (Onan dealer).

## CRITICAL MAINTENANCE SCHEDULE

MAINTENANCE ITEMS	OPERATIONAL HOURS			
	200	500	1000	5000
Check Breaker Points	x			
Clean Commutator and Collector Rings	x1			
Check Brushes	x2			
Remove Carbon & Lead		x		
Check Valve Clearance		x		
Clean Carburetor		x		
Clean Generator			x	
Remove & Clean Oil Base			x	
Grind Valves			x	
General Overhaul				x

x - Perform as indicated in tables.

x1 - Perform more often in extremely dusty conditions.

x2 - Replace revolving field collector ring brushes when worn to 5/16" or less - Replace all other brushes when worn to 5/8" or less.

# TROUBLE-SHOOTING GUIDE

TROUBLE																		GASOLINE ENGINE TROUBLESHOOTING GUIDE	
Backfire at Carburetor	Backfire at Exhaust	Black Exhaust	Blue Exhaust	Burned Valves	Connecting Rod Wear	Crankshaft Slowing	Engine Stops	Failure to Start	Governor Hopping	High Oil Pressure	Low Oil Pressure	Loss of Coolant (Water Cooled)	Mechanical Knock	Misfiring	Overheating (Air Cooled)	Piston Wear	Poor Compression	Ring Wear	Sticking Valves
																		CAUSE	
																		STARTING SYSTEM	
																		Loose or Corroded Battery Connection	
																		Low or Discharged Battery	
																		Faulty Starter	
																		Faulty Start Solenoid	
																		IGNITION SYSTEM	
																		Ignition Timing Wrong	
																		Wrong Spark Plug Gap	
																		Worn Points or Improper Gap Setting	
																		Bad Ignition Coil or Condenser	
																		Faulty Spark Plug Wires	
																		FUEL SYSTEM	
																		Out of Fuel - Check	
																		Lean Fuel Mixture - Readjust	
																		Rich Fuel Mixture or Choke Stuck	
																		Engine Flooded	
																		Poor Quality Fuel	
																		Dirty Carburetor	
																		Dirty Air Cleaner	
																		Dirty Fuel Filter	
																		Defective Fuel Pump	
																		INTERNAL ENGINE	
																		Wrong Valve Clearance	
																		Broken Valve Spring	
																		Valve or Valve Seal Leaking	
																		Piston Rings Worn or Broken	
																		Wrong Bearing Clearance	
																		COOLING SYSTEM (AIR COOLED)	
																		Poor Air Circulation	
																		Dirty or Oily Cooling Fins	
																		Blown Head Gasket	
																		COOLING SYSTEM (WATER COOLED)	
																		Insufficient Coolant	
																		Faulty Thermostat	
																		Worn Water Pump or Pump Seal	
																		Water Passages Restricted	
																		Defective Gaskets	
																		Blown Head Gasket	
																		LUBRICATION SYSTEM	
																		Defective Oil Gauge	
																		Relief Valve Stuck	
																		Faulty Oil Pump	
																		Dirty Oil or Filter	
																		Oil Too Light or Diluted	
																		Oil Level Low	
																		Oil Too Heavy	
																		Dirty Crankcase Breather Valve	
																		THROTTLE AND GOVERNOR	
																		Linkage Out of Adjustment	
																		Linkage Worn or Disconnected	
																		Governor Spring Sensitivity Too Great	
																		Linkage Binding	

# PARTS CATALOG

## INSTRUCTIONS FOR ORDERING REPAIR PARTS

For parts or service, contact the dealer from whom you purchased this equipment or refer to your Nearest Authorized Onan Parts and Service Center.

To avoid errors or delay in filling your parts order, please furnish all information requested.

Always refer to the nameplate on your unit:

1. Always give the MODEL and SPEC NO. and SERIAL NO.

Pre 1969

<b>Onan</b>	
<b>ELECTRIC PLANT</b>	
MODEL AND SPEC. NO.	
305 CCK-3R/1112E	
SERIAL NO. 32068125F	
IMPORTANT: ALWAYS GIVE ABOVE NOS WHEN ORDERING PARTS	
A.C. VOLTS	PH.
KVA	WATTS
P.F.	AMPS Hz
D.C. VOLTS	AMPS
WATTS	
RPM	BAT.
MANUFACTURED BY	
ONAN	
DIVISION OF ONAN CORPORATION	
MINNEAPOLIS, MINNESOTA	
MADE IN U.S.A.	
FOR ELECT. EQUIPMENT ONLY	
99A444	

For handy reference, insert YOUR plant nameplate information in the spaces above.

2. Do not order by reference number or group number, always use part number and description.
3. Give the part number, description and quantity needed of each item. If an older part cannot be identified, return the part prepaid to your dealer or nearest AUTHORIZED SERVICE STATION. Print your name and address plainly on the package. Write a letter to the same address stating the reason for returning the part.
4. State definite shipping instructions. Any claim for loss or damage to your unit in transit should be filed promptly against the transportation company making the delivery. Shipments are complete unless the packing list indicates items are back ordered.

Prices are purposely omitted from this Parts Catalog due to the confusion resulting from fluctuating costs, import duties, sales taxes, exchange rates, etc.

For current parts prices, consult your Onan Dealer, Distributor or Parts and Service Center.

"En esta lista de partes los precios se omiten de proposito, ya que bastante confusion resulto de fluctuaciones de los precios, derechos aduanales, impuestos de venta, cambios extranjeros, etc."

Consiga los precios vigentes de su distribuidor de productos "ONAN".

This catalog applies to the standard CCK Plants as listed below. Parts are arranged in groups of related items. Each illustrated part is identified by a reference number corresponding to a reference number following the illustration. Parts illustrations are typical. Using the *Model and Spec No.* from the plant nameplate, select the Parts Key No. (1, 2, etc. in the last column) that applies to your plant Model and Spec No. This Parts Key No. represents parts that differ between models. Unless otherwise mentioned in the description, parts are interchangeable between models. Right and left plant sides are determined by *facing* the engine end (front) of the plant.

PLANT DATA TABLE

* MODEL & SPEC NO.	TYPE	ELECTRICAL DATA					PARTS KEY NO.
		WATTS	VOLTS $\pm$	HERTZ	WIRE	PHASE	
4.0CCK-1M/ $\pm$	MANUAL	4000**	120	60	2	1	1
4.0CCK-2M/ $\pm$	MANUAL	4000**	240	60	2	1	1
4.0CCK-3M/ $\pm$	MANUAL	4000**	120/240	60	3	1	1
4.0CCK-4M/ $\pm$	MANUAL	4000**	120/208	60	4	3	1
4.0CCK-5M/ $\pm$	MANUAL	4000**	240	60	3	3	1
3.5CCK-51M/ $\pm$	MANUAL	3500	120	50	2	1	1
3.5CCK-52M/ $\pm$	MANUAL	3500	240	50	2	1	1
3.5CCK-53M/ $\pm$	MANUAL	3500	120/240	50	3	1	1
4.0CCK-1P/ $\pm$	PORTABLE	4000**	120	60	2	1	2
4.0CCK-2P/ $\pm$	PORTABLE	4000**	240	60	2	1	2
4.0CCK-3P/ $\pm$	PORTABLE	4000**	120/240	60	3	1	2
4.0CCK-3CP/ $\pm$	PORTABLE	4000**	120/240	60	†	1	2
4.0CCK-4P/ $\pm$	PORTABLE	4000**	120/208	60	4	3	2
4.0CCK-5P/ $\pm$	PORTABLE	4000**	240	60	3	3	2
3.5CCK-51P/ $\pm$	PORTABLE	3500	120	50	2	1	2
3.5CCK-52P/ $\pm$	PORTABLE	3500	240	50	2	1	2
3.5CCK-53P/ $\pm$	PORTABLE	3500	120/240	50	3	1	2
3.5CCK-53CP/ $\pm$	PORTABLE	3500	120/240	50	†	1	2
3.5CCK-55P/ $\pm$	PORTABLE	3500	240	50	3	3	2
4.0CCK-1R/ $\pm$	REMOTE	4000**	120	60	2	1	3
4.0CCK-2R/ $\pm$	REMOTE	4000**	240	60	2	1	3
4.0CCK-3R/ $\pm$	REMOTE	4000**	120/240	60	3	1	3
4.0CCK-3CR/ $\pm$	REMOTE	4000**	120/240	60	†	1	3
4.0CCK-4R/ $\pm$	REMOTE	4000**	120/208	60	4	3	3
4.0CCK-5R/ $\pm$	REMOTE	4000**	240	60	3	3	3
3.5CCK-51R/ $\pm$	REMOTE	3500	120	50	2	1	3
3.5CCK-52R/ $\pm$	REMOTE	3500	240	50	2	1	3
3.5CCK-53R/ $\pm$	REMOTE	3500	120/240	50	3	1	3
3.5CCK-53CR/ $\pm$	REMOTE	3500	120/240	50	†	1	3
3.5CCK-55R/ $\pm$	REMOTE	3500	240	50	3	3	3
4.2CCK-52R/ $\pm$	REMOTE	4250	240	50	2	1	4
4.2CCK-53R/ $\pm$	REMOTE	4250	120/240	50	3	1	4
4.2CCK-53CR/ $\pm$	REMOTE	4250	120/240	50	†	1	4
4.2CCK-55DR/ $\pm$	REMOTE	4250	120/240	50	4	3	4
4.2CCK-57R/ $\pm$	REMOTE	4250	220/380	50	4	3	4

PLANT DATA TABLE (Continued)

* MODEL & SPEC NO.	TYPE	ELECTRICAL DATA					PARTS KEY NO.
		WATTS	VOLTS $\angle$	HERTZ	WIRE	PHASE	
5.0CCK-1M/ $\Delta$	MANUAL	5000	120	60	2	1	5
5.0CCK-2M/ $\Delta$	MANUAL	5000	240	60	2	1	5
5.0CCK-3M/ $\Delta$	MANUAL	5000	120/240	60	3	1	5
5.0CCK-4M/ $\Delta$	MANUAL	5000	120/208	60	4	3	5
5.0CCK-5M/ $\Delta$	MANUAL	5000	240	60	3	3	5
5.0CCK-1P/ $\Delta$	PORTABLE	5000	120	60	2	1	6
5.0CCK-2P/ $\Delta$	PORTABLE	5000	240	60	2	1	6
5.0CCK-3P/ $\Delta$	PORTABLE	5000	120/240	60	3	1	6
5.0CCK-3CP/ $\Delta$	PORTABLE	5000	120/240	60	†	1	6
5.0CCK-4P/ $\Delta$	PORTABLE	5000	120/208	60	4	3	6
5.0CCK-5P/ $\Delta$	PORTABLE	5000	240	60	3	3	6
5.0CCK-1R/ $\Delta$	REMOTE	5000	120	60	2	1	7
5.0CCK-2R/ $\Delta$	REMOTE	5000	240	60	2	1	7
5.0CCK-3R/ $\Delta$	REMOTE	5000	120/240	60	3	1	7
5.0CCK-3CR/ $\Delta$	REMOTE	5000	120/240	60	†	1	7
5.0CCK-4R/ $\Delta$	REMOTE	5000	120/208	60	4	3	7
5.0CCK-4XR/ $\Delta$	REMOTE	5000	277/480	60	4	3	7
5.0CCK-5R/ $\Delta$	REMOTE	5000	240	60	3	3	7
5.0CCK-115P/ $\Delta$	PORTABLE	5000	120	DC	—	—	8
5.0CCK-150M/ $\Delta$	MANUAL	5000	250	DC	—	—	9
5.0CCK-150R/ $\Delta$	REMOTE	5000	250	DC	—	—	10
Contractor Models	See Special Parts List Following Standard Parts List						

\* - Identical to early models stamped 305CCK.

$\Delta$  - The Specification Letter advances (A to B, B to C, etc.) with manufacturing changes.

$\angle$  - Reference to 120, 240 and 120/240 volt also applies to 115, 230 and 115/230 volt.

† - These generators have 4 load wires which are reconnectable for 120 volt 2 wire service, or 240 volt 2 wire service, or 120/240 volt 3 wire service.

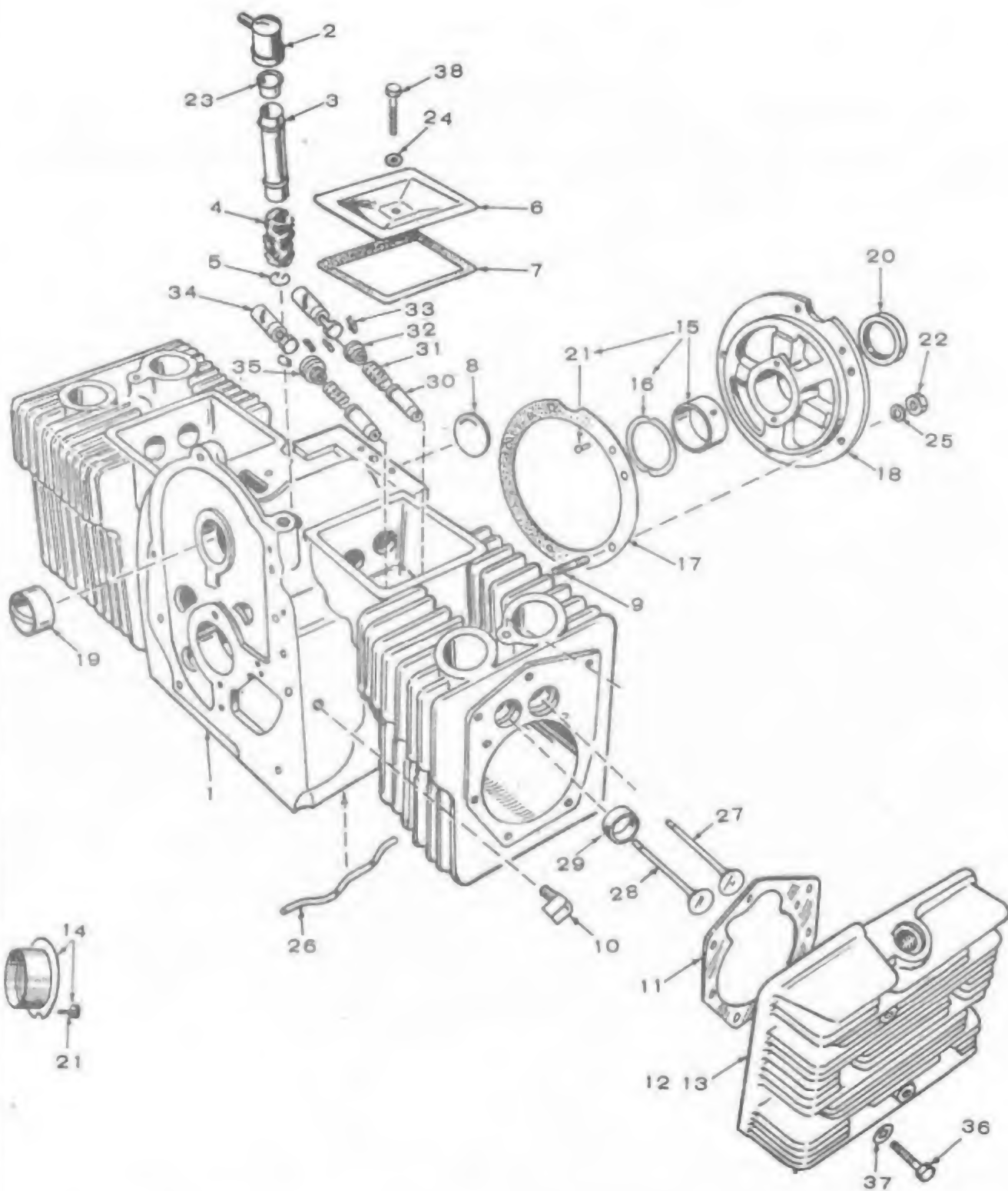
\* - New model designations shown, begin during 1969. Previous designations did not use a decimal in the KW rating. EXAMPLE: 3.5CCK was formerly 305CCK and 4.0CCK was formerly 4CCK. Also previously a V was used in the model to designate vacu-flo cooling.

NOTE: Hertz is a unit of frequency equal to one cycle per second.

### NOTICE

The Onan part numbering system has been changed to computerize the numbers. Letter in the number will be replaced with a dash (—) and number after the dash will be zero filled. Parts invoices will have the new computerized number, part remains the same. Parts Catalogs will be revised as time permits.

EXAMPLE:	Old Number	New Number
	101A86	101-0086
	110A1895	110-1895



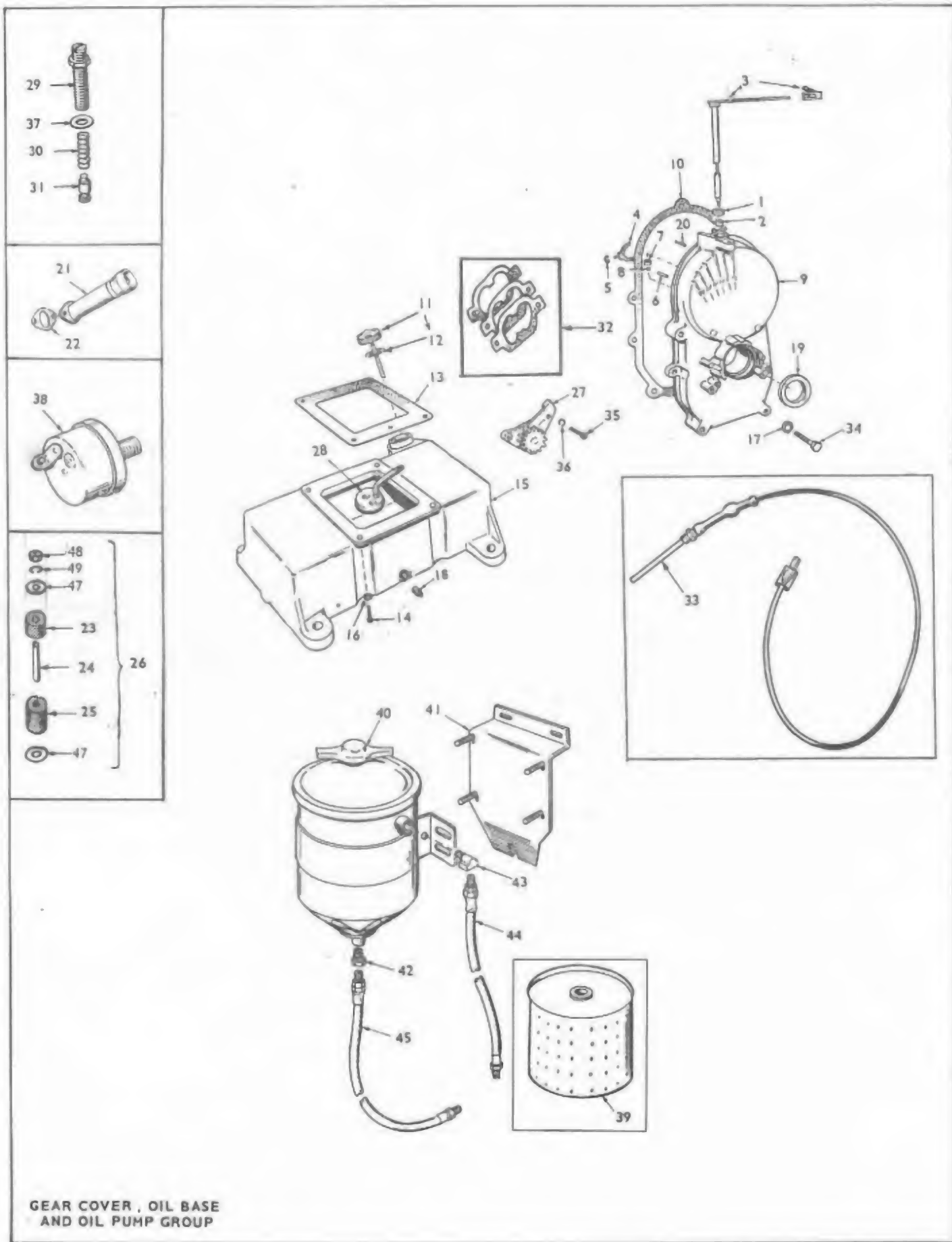
CYLINDER BLOCK GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	110A915	1	Block Assy., Cylinder (Incl. Parts Marked *)
2	123B293	1	Cap, Breather Tube (Rubber)
3	123A129	1	Tube, Breather (Incl. Steel Baffles)
4	123A129	1	Baffle, Breather Tube (Models Without Steel Baffle)
5	123A643	1	Ring, Breather Baffle Retainer (Models Without Steel Baffle)
6	110A666	2	Cover, Valve Compartment
7	110A667	2	Gasket, Valve Cover
8	517-48	1	*Plug, Camshaft Expansion
9	520A114	5	*Stud, Rear Bearing Plate Mtg. (5/16 x 1-5/16")
10	502A20	1	Elbow, Street, Oil Line
11	110A892	2	Gasket, Cylinder Head
12	HEAD, CYLINDER, RIGHT, #2 CYLINDER		
	110D890	1	Standard Compression
	110D884	1	Hi-Compression, Gas Fuel Models
13	HEAD, CYLINDER, LEFT, #1 CYLINDER		
	110D891	1	Standard Compression
	110D883	1	Hi-Compression, Gas Fuel Models
14	BEARING, CRANKSHAFT - PRIOR TO SPEC F (Includes Stop Pins)		
	101K181	2	Standard
	101K181-02	2	.002" Undersize
	101K181-10	2	.010" Undersize
	101K181-20	2	.020" Undersize
	101K181-30	2	.030" Undersize
15	*BEARING, CRANKSHAFT - BEGIN SPEC F (Includes Thrust Washer And Stop Pins)		
	101K420	2	Standard
	101K420-02	2	.002" Undersize
	101K420-10	2	.010" Undersize
	101K420-20	2	.020" Undersize
	101K420-30	2	.030" Undersize
16	104A575	2	*Washer, Crankshaft Bearing Thrust - Begin Spec F
17	101K115	1	*Gasket Kit, Bearing Plate
18	*PLATE, BEARING (EXCLUDES BEARING)		
	101C258	1	Prior to Spec F
	101C316	1	Begin Spec F

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
19	101A367	2	*Bearing, Camshaft Front & Rear (Precision)
20	509A41	1	Seal, Bearing Plate
21	516A72	4	*Pin, Main Bearing Stop (2 Only Prior to Spec F)
22	110A445	5	*Nut, Bearing Plate Stud
23	123A104	1	Valve, Breather Tube
24	526-63	2	Washer (Copper), Valve Comp.
25	850-45	5	*Washer, Lock (5/16) Rear Bearing Plate
26	120A386	1	*Tube, Crankcase Oil
27	110B881	2	Valve, Intake (Steel)
28	110B880	2	Valve, Exhaust (Stellite)
29	*INSERT, EXHAUST VALVE SEAT (STELLITE)		
	110A872	2	Standard
	110A872-02	2	.002" Oversize
	110A872-05	2	.005" Oversize
	110A872-10	2	.010" Oversize
	110A872-25	2	.025" Oversize
30	110A902	4	*Guide, Valve
31	110A539	4	Spring, Valve
32	110A893	2	Washer, Valve Spring Retaining (Intake)
33	110A639	8	Lock, Valve & Spring Ret.
34	TAPPET, VALVE		
	115A6	4	Standard
	115A6-05	4	.005" Oversize
35	110A904	2	Rotocap, Exhaust Valve
36	SCREW, HEX HEAD CAP (HARDENED)		
	110A879	8	Cylinder Head (5/16-18 x 1-1/4")
	110A284	10	Cylinder Head (5/16-18 x 1-1/2") - Prior to Serial #549970
	114A22	10	Cylinder Head (5/16-18 x 1-3/4") - Begin Serial #549970
37	526A122	18	Washer (Flat), Cylinder Head Screws
38	800-12	2	Screw (1/4-20 x 2-1/4") - Valve Compartment Cover

\* - Included In 110A915 Cylinder Block Assembly.

**NOTE:** Engine valves and related parts do not apply to Spec A plants. Order valves, valve spring retainers, rotor caps, guides, and cylinder block by description giving complete Model, Spec, and Serial No.



GEAR COVER, OIL BASE  
AND OIL PUMP GROUP

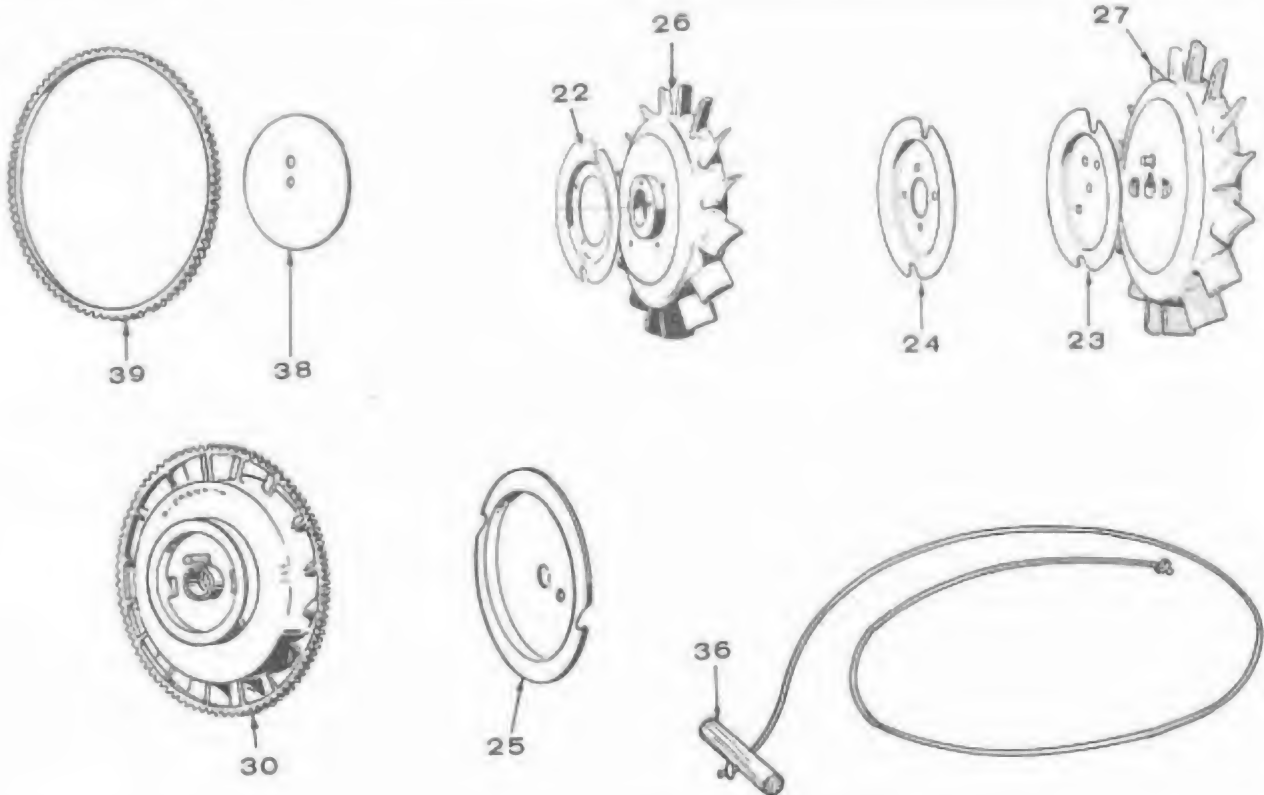
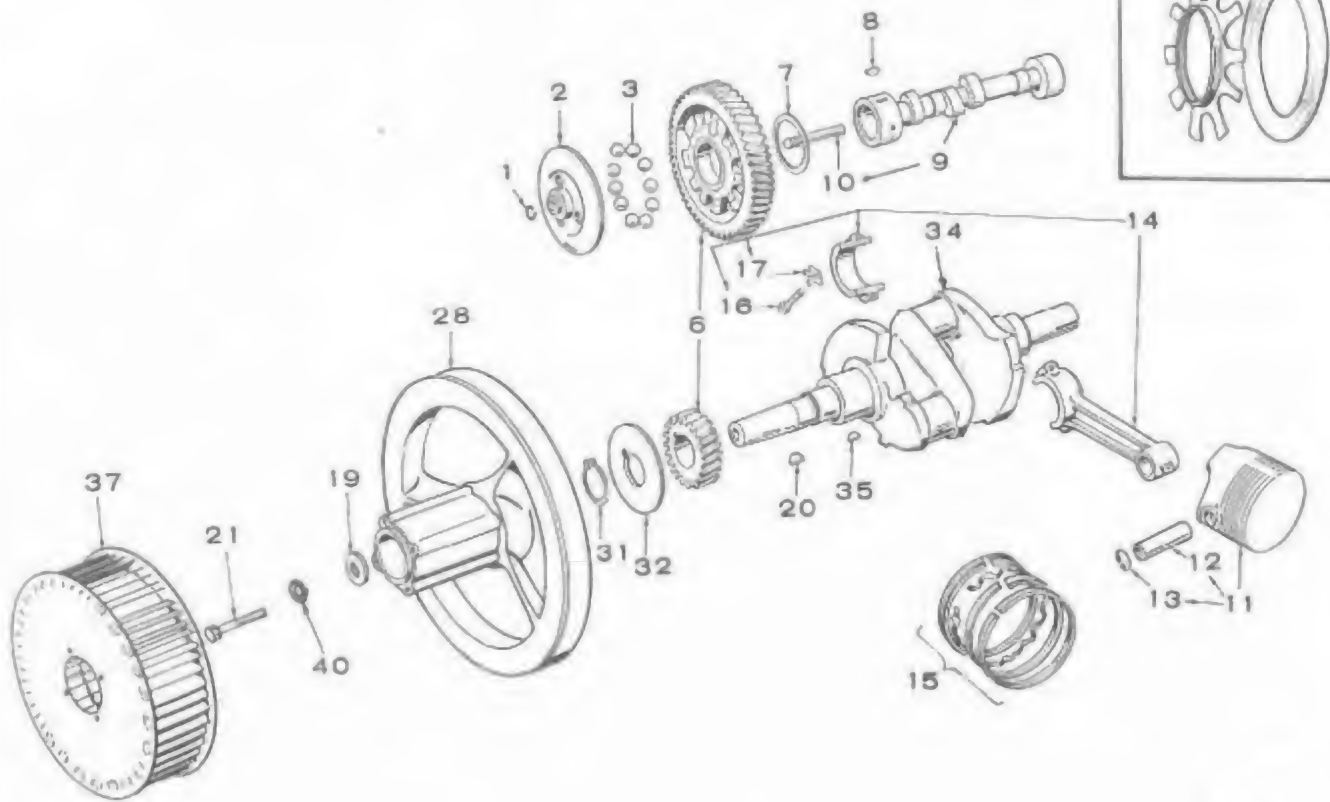
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	509-8	1	*Seal, Oil - Governor Shaft
2	510P13	1	*Bearing, Governor Shaft Upper
3	150-710	1	*Shaft & Arm Assembly, Governor (Includes Adjusting Clip)
4	150A620	1	*Yoke, Governor Shaft
5	518-129	1	*Ring, Yoke Retainer "E"
6	516-130	1	*Pin, Governor Cup Stop (In Gear Cover)
7	510A8	1	*Bearing, Governor Shaft, Lower
8	510P14	1	*Ball, Bearing - Governor Shaft
9	103-207	1	Cover Assembly, Gear (Includes Parts Marked *)
10	103B11	1	Gasket, Gear Cover
11	INDICATOR, OIL FILL		
	123A510	1	Key 1, 2, 5, 6, 8 Prior to Spec D
	123A489	1	Begin Spec D
	123A489	1	Key 3, 4, 7, 9
	123A544	1	Key 10
12	123A191	1	Gasket, Oil Fill Cap
13	102B158	1	Gasket, Oil Base Mounting
14	102A455	4	Screw, Cap, Oil Base to Block
15	BASE, OIL		
	102A331	1	Key 1, 2, 5, 6, 8 Prior to Spec D
	102A418	1	Begin Spec D
	102A428	1	Key 3, 4, 7, 9
	102E395	1	Key 10
	102A467	1	Key 3, 4, 7 With Oil Filter - Optional
	£	1	Key 1, 2, 5, 6, 8, 9, 10 With Oil Filter - Optional
16	850-50	4	Washer, Lock (3/8)
17	850-45	5	Washer, Lock (5/16)
18	PLUG, OIL DRAIN		
	505-110	1	Early Models (3/8)
	505-56	1	Later Models (1/2)
19	509A40	1	*Seal, Gear Cover
20	516A11	2	Pin, Gear Cover (5/16 x 1-1/8")
21	123B531	1	Tube, Oil Fill, Key 10
22	141A78	1	Gasket, Oil Fill Tube Mounting - Key 10
23	402A131	4	Cushion, Plant Mounting (Upper)
24	BUSHING, SPACER		
	402A137	4	Key 1, 2, 3, 4, 5, 6, 7, 8, 9
	402A137	2	Key 10 (Generator End)
	402A176	2	Key 10 (Engine End)
25	CUSHION, PLANT MOUNTING (LOWER)		
	402A38	4	Key 1, 2, 3, 4, 5, 6, 7, 8, 9
	402A38	2	Key 10 (Generator End)
	402A36	2	Key 10 (Engine End)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
26	CUSHION ASSEMBLY, PLANT MOUNTING (INCLUDES CUSHIONS, BUSHING & HARDWARE)		
	402A145	4	Key 2, 6, 8
	402A138	4	Key 1, 3, 4, 5, 7, 9
	402A138	2	Key 10 (Generator End)
	402A177	2	Key 10 (Engine End)
27	120A491	1	Pump, Oil, Complete (Internal parts not sold separately).
28	CUP, OIL PUMP INTAKE (INCLUDES PIPE, CUP AND SCREEN)		
	120B411	1	Key 1, 2, 5, 6, 8 Prior to Spec D
	120B400	1	Begin Spec D
	120B400	1	Key 3, 4, 7, 9, 10
29	120A187	1	Stud Assembly, By-Pass Adj. (Includes Nut)
30	120A140	1	Spring, By-Pass Valve
31	120A398	1	Valve, By-Pass
32	120K161	1	Gasket Kit, Oil Pump
33	102B558	1	Heater, Oil Base (Optional)
34	SCREW, GEAR COVER MOUNTING		
	114A22	4	5/16-18 x 1-3/4"
	800-34	1	5/16-18 x 2-1/4"
35	800-7	2	Screw (1/4-20 x 1") - Oil Pump Mounting
36	850-40	2	Washer, Lock (1/4)
37	526-66	1	Washer, Oil Pressure Relief
38	309-10	1	Switch, Low Oil Pressure (Opt.)
39	122-37	1	Cartridge, Oil Filter, Includes Gasket (Optional)
40	122C91	1	Filter, Oil - Includes Cartridge (Optional)
41	122B88	1	Bracket, Oil Filter Mounting (Optional)
42	502-3	1	Connector, Oil Filter Outlet (Optional)
43	502-2	1	Elbow, Oil Filter Inlet - (Optional)
44	501A4	1	Line, Oil Filter Return - (Opt.)
45	501A5	1	Line, Oil Filter - Pressure (Optional)
47	526-76	8	Washer, Flat (11/32" I.D. x 1-1/2" O.D. x 1/16")
48	862-15	4	Nut, Hex (5/16-18)
49	850-46	4	Washer, Lock (5/16)

\* - Included in Gear Cover Assembly.

£ - Refer to factory giving complete Model, Spec, and Serial Number.

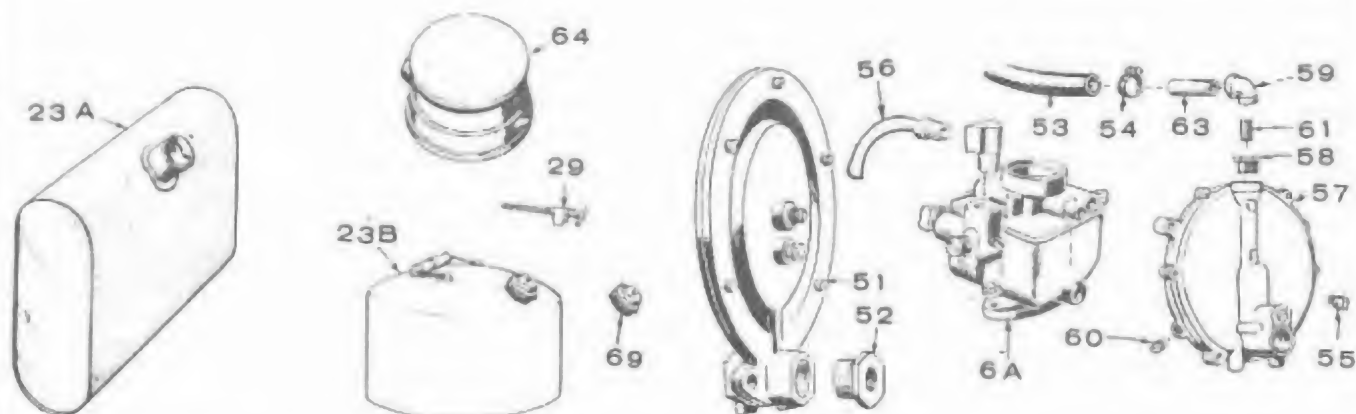
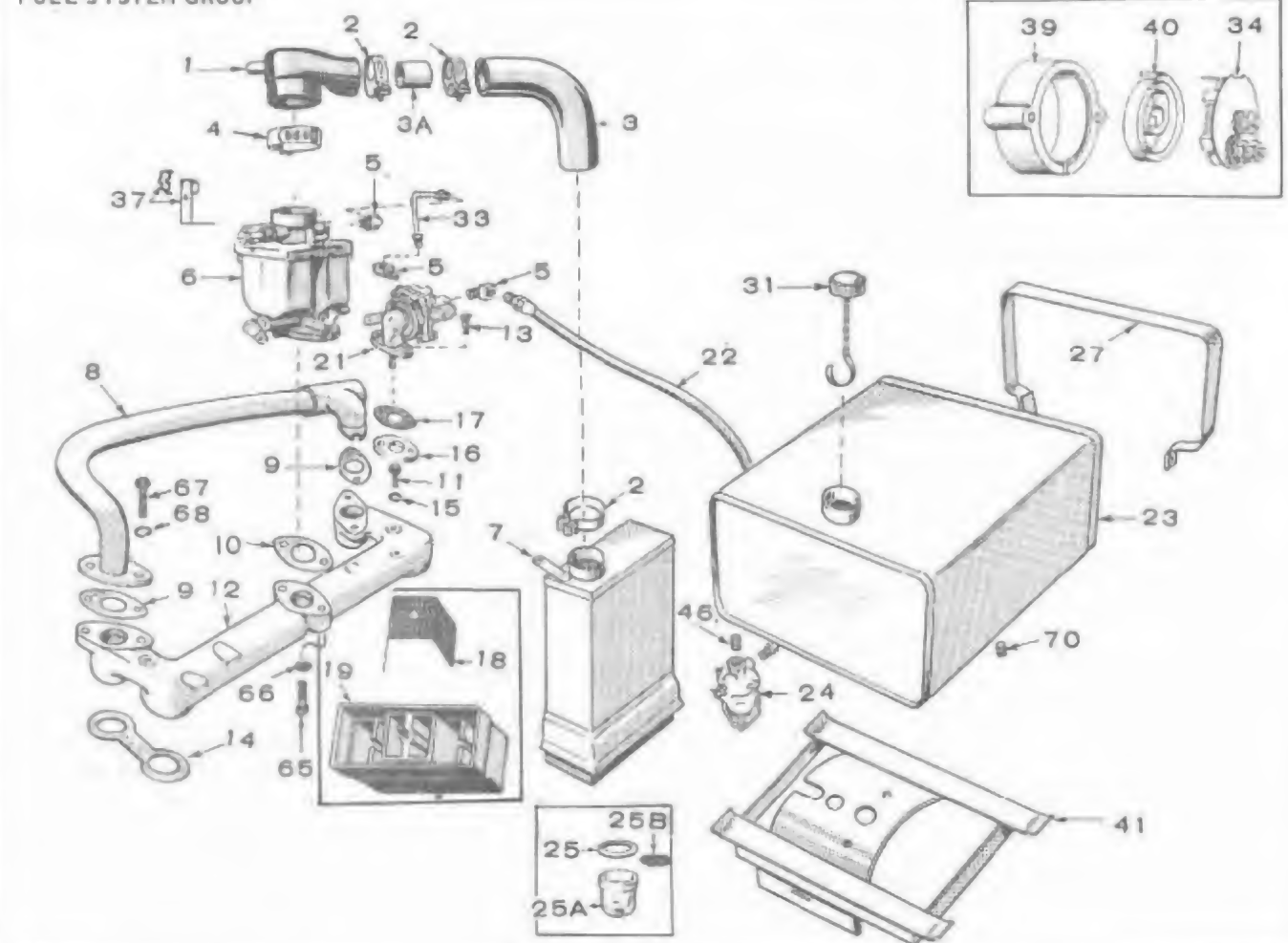
# CRANKSHAFT, FLYWHEEL, CAMSHAFT AND PISTON GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	150A78	1	Ring, Camshaft Center Pin
2	150A612	1	Cup, Governor
3	BALL, FLY - GOVERNOR		
	510P15	10	Key 1, 2, 3, 4, 5, 6, 7
	510P15	5	Key 8, 9, 10
4	150B85	1	Spacer, Governor Fly Ball, Prior to Spec F
5	150A77	1	Plate, Governor Fly Ball, Prior to Spec F
6	GEAR SET, TIMING, (INCLUDES CAM & CRANK-SHAFT GEARS)		
	105A72	1	Prior to Spec F
	105A353	1	Begin Spec F, Cam. Gear Incl. Flyball Spacer & Plate
7	105A4	1	Washer, Camshaft Gear Thrust
8	515-1	1	Key, Camshaft Gear Mounting
9	105-140	1	Camshaft (Incl. Center Pin)
10	150A75	1	Pin, Camshaft Center
11	PISTON AND PIN (INCLUDES RETAINING RINGS)		
	112-71	2	Standard
	112-71-05	2	.005" Oversize
	112-71-10	2	.010" Oversize
	112-71-20	2	.020" Oversize
	112-71-30	2	.030" Oversize
	112-71-40	2	.040" Oversize
12	PIN, PISTON		
	117A69	2	Standard
13	112A3	4	Ring, Piston Pin Retainer
14	ROD, CONNECTING		
	114C98	2	Standard
	114C98-10	2	.010" Undersize
	114C98-20	2	.020" Undersize
	114C98-30	2	.030" Undersize
15	RING SET, PISTON		
	113A152	2	Standard
	113A152-05	2	.005" Oversize
	113A152-10	2	.010" Oversize
	113A152-20	2	.020" Oversize
	113A152-30	2	.030" Oversize
	113A152-40	2	.040" Oversize
16	110A284	4	Screw, Connecting Rod Cap

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
17	114A59	4	Washer, Lock - Connecting Rod Cap Screw
19	WASHER, WHEEL MOUNTING		
	526A17	1	Key 3, 4, 5, 7 (Also Key 1, 2, 5, 6, 8, 9 Prior to Spec D)
	526A128	1	Key 10
20	515-2	1	Key, Wheel Mounting
21	SCREW, WHEEL MOUNTING		
	104A170	1	Key 1, 2, 3, 4, 5, 6, 7, 8, 9
	104A369	1	Key 10
	SHEAVE, ROPE		
22	160B222	1	Key 1, 2, 5, 6, 8, 9 Prior to Spec D
23	192B291	1	Pressure Cooled Plants Key 3, 4, 7, 10 Prior to Spec D
24	192B272	1	Vacu-Flo Cooled Plants Key 3, 4, 7
25	192B308	1	Pressure Cooled Plants, Begin Spec D
	FLYWHEEL		
26	160D202	1	Key 1, 2, 5, 6, 8, 9 Prior to Spec D
27	160D650	1	Key 1, 2, 5, 6, 8, 9 Begin Spec D
	134D591	1	Pressure Cooled Plants, Key 3, 4, 7
28	104K691	1	Vacu-Flo Cooled Plants, Key 3, 4, 7 Prior to Serial 745278
28	104D499	1	Vacu-Flo Cooled Plants, Key 3, 4, 7 Begin Serial 745278
30	134B675	1	Key 10 (Includes Ring Gear)
31	518-14	1	Lock, Crankshaft Gear Washer
32	104A43	1	Washer, Crankshaft Gear Retainer
34	104D578	1	Crankshaft
35	515-1	1	Key, Crankshaft Gear Mounting
36	192A83	1	Rope, Manual Starting, Key 3, 4, 7, 10
37	134B565	1	Wheel, Blower (Vacu-Flo Cooled Plants) Key 3, 4, 7
38	192B296	1	Backplate, Rope Sheave, Key 10
39	134C673	1	Gear, Ring, Flywheel, Key 10
40	850-55	1	Washer, Lock (7/16)

# FUEL SYSTEM GROUP

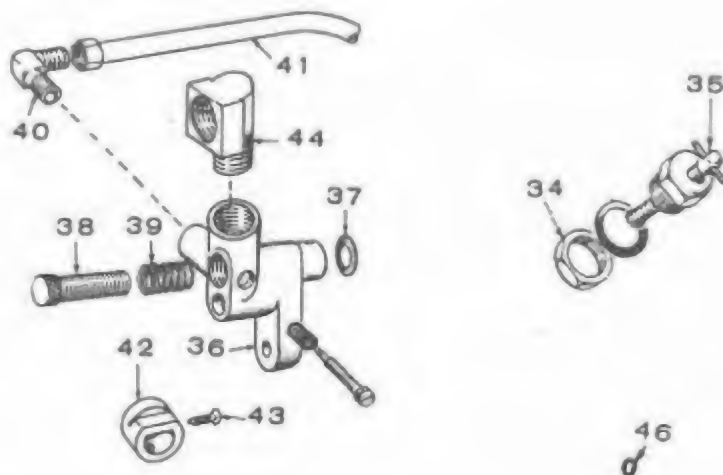
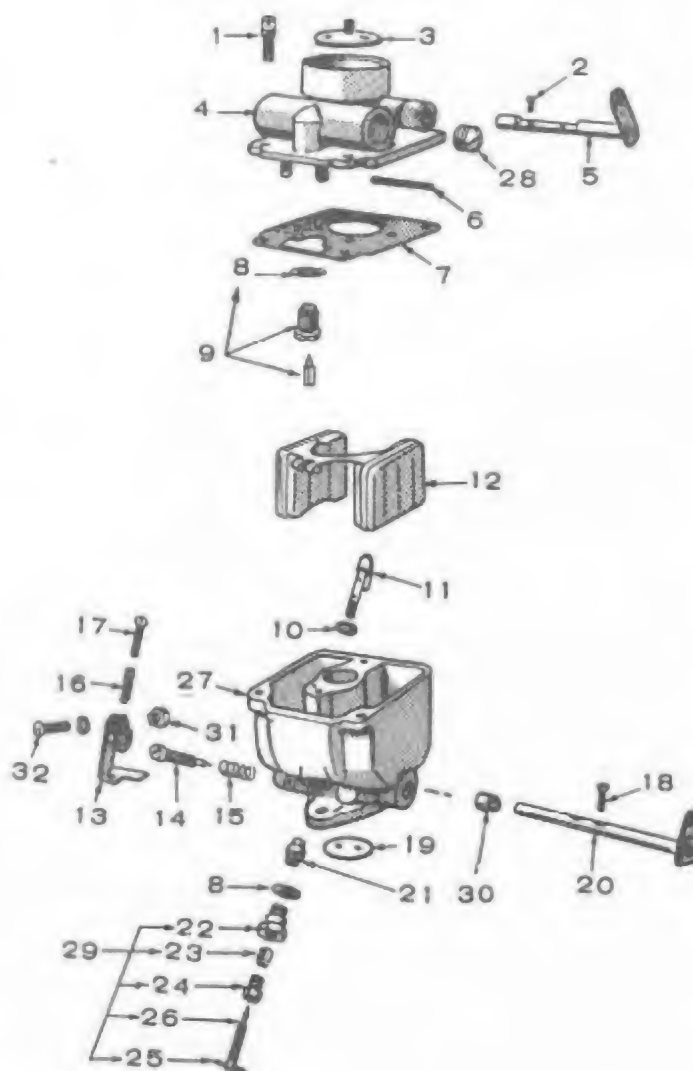


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	145B80	1	Inlet, Carburetor Air
2	503-280	3	Clamp, Air Cleaner Hose
3	503A480	1	Hose, Air Cleaner
3A	140A211	1	Sleeve, Air Cleaner Hose
4	503-107	1	Clamp, Air Inlet to Carburetor
5	502-2	3	Elbow (Inverted Male) - (2) Fuel Pump (1) Carburetor
6	*CARBURETOR ASSEMBLY, GASOLINE		
	142A363	1	Manual Choke, Key 1, 2, 5, 6, 8, 9, 10
	142A364	1	Electric Choke, Key 3, 4, 7
6A	*CARBURETOR ASSEMBLY, GAS-GASOLINE (Optional)		
	142C367	1	Manual Choke, Key 1, 2, 5, 6, 8, 9, 10
	142C366	1	Electric Choke, Key 3, 4, 7
7	140C399	1	Cleaner, Air
8	MANIFOLD, EXHAUST, PRESSURE COOLED PLANTS		
	154C526	1	Key 1, 2, 3, 4, 5, 6, 7, 8, 9
	154C451	1	Key 10 - Prior to Spec J
	154C876	1	Key 10 - Begin Spec J
8A	154C377	1	Manifold, Exhaust, Vacu-Flo Cooled Plants, Key 3, 4, 7
8B	505-138	1	Coupling (Reducer), Exhaust Manifold, Vacu-Flo Cooled Plants, Key 3, 4, 7
9	154A360	2	Gasket, Exhaust Manifold or Muffler Mounting
10	141A78	1	Gasket, Carburetor Mounting
11	800-54	2	Screw (3/8-16 x 2") - Intake Manifold Mounting
12	MANIFOLD, INTAKE		
	154A383	1	Key 1, 2, 3, 4, 5, 6, 7
	154D356	1	Key 8, 9, 10
13	806-9	2	Screw (1/4-20 x 1-1/4") - Fuel Pump Mounting
14	154A13	2	Gasket, Intake Manifold
15	850-50	2	Washer, Lock (3/8)
16	149A45	1	Spacer, Fuel Pump
17	149A3	2	Gasket, Fuel Pump & Spacer Mounting
18	140A68	1	Screen, Air Cleaner
19	140K403	1	Cup Assembly, Air Cleaner, Includes Screen
21	149D693	1	Pump, Fuel
22	501B5	1	Line, Fuel Filter to Fuel Pump (18-1/2") Key 1, 2, 3, 4, 5, 6, 7, 9, 10
	TANK, FUEL		
23	159C546	1	Key 2, 6 (4 Gal.) Mounted
23A	159C558	1	Key 8 (6 Gal.) Mounted
23B	415A126	1	Key 1, 3, 4, 5, 7, 9, 10 (5 Gal.) Separate (Optional)
24	149B79	1	Filter, Fuel, Key 1, 2, 3, 4, 5, 6, 7, 9, 10
25	149-149	1	Gasket, Fuel Filter Bowl, Key 1, 2, 3, 4, 5, 6, 7, 9, 10
25A	149-150	1	Bowl, Fuel Filter, Key 1, 2, 3, 4, 5, 6, 7, 9, 10
25B	149-202	1	Screen, Fuel Filter
26	149A616	1	Bracket, Fuel Filter, Key 1, 3, 4, 5, 7, 9, 10
27	STRAP, FUEL TANK MOUNTING		
	159A537	2	Key 2, 6
	159A588	2	Key 8
29	504A13	1	Valve, Fuel Tank Shut-off, Key 1, 3, 4, 5, 7, 9, 10 (Opt.)
31	159B20	1	Cap, Fuel Tank, Key 2, 6, 8
32	LINE, FUEL, FLEXIBLE TANK TO UNIT (Optional)		
	501A7	1	24"
	501A9	1	36"
	501A27	1	48"
33	149A611	1	Line, Fuel Pump to Carburetor
34	153A113	1	Cover, Electric Choke, Key 3, 4, 7

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
37	153-263	1	Bracket & Clip, Choke, Key 1, 2, 5, 6, 8, 9
38	153B97	1	Choke, Manual, Key 1, 2, 5, 6, 8, 9
39	153-440	1	Bracket, Electric Choke, Key 3, 4, 7
40	153A17	1	Element, Choke Bi-Metal, Key 3, 4, 7
41	159D531	1	Bracket, Fuel Tank Mounting, Key 2, 6
44	502-20	1	Elbow, Street, Filter Bracket, Key 1, 3, 4, 5, 7, 9, 10
46	NIPPLE (1/8 x 3/4") BRASS		
	502-46	1	Bracket to Filter Inlet, Key 1, 3, 4, 5, 7, 9, 10
	502-46	1	Tank to Filter Inlet, Key 2, 6
47	153A227	1	Linkage, Choke, Key 10
48	152A155	1	Swivel, Choke Linkage, Key 10
49	153A223	1	Choke, Key 10
50	153A222	1	Bracket, Choke, Key 10
51	148A428	1	Regulator, Ensign, Gas (Opt.) Plants With Gas-Gasoline Carburetor
52	505-21	1	Bushing, Reducer (3/4 x 1/2") Ensign Reg. Outlet (Optional)
53	503-315	1	Hose, Regulator to Carburetor (Optional)
54	503-32	2	Clamp, Hose (Optional)
55	148A107	1	Vent (Optional)
56	PIPE, FUEL (OPTIONAL)		
	148B633	1	Pressure Cooled Plants
	148A147	1	Vacu-Flo Cooled Plants
57	148C311	1	Regulator, Garretson (Optional)
58	505-17	1	Bushing, Reducer 3/8 x 1/4" (Optional)
59	505-38	1	Elbow, 1/4" (Optional)
60	505-57	1	Plug, Pipe 1/8" (Optional)
61	505-99	1	Nipple, 1/4 x 7/8" (Optional)
63	505-302	1	Nipple, Half (Optional)
64	415A124	1	Cap, Rain, Dome Type Tank, Key 1, 3, 4, 5, 7, 9, 10
65	800-9	2	Screw (1/4-20 x 1-1/2") - Carburetor Mounting
66	850-40	2	Washer, Lock (1/4")
67	800-29	4	Screw (5/16-18 x 1-1/8") - Manifold Mounting
68	526-122	4	Washer, Flat (5/16")
69	415P313	1	Cap, Fuel Tank
70	505-57	2	Plug, Tank Drain, Key 2, 6
	505-8	1	Plug, Pipe, Ensign Gas Reg. (Optional)
	149A117	1	Elbow & Screen Assembly (Tank Outlet), Key 8
	332-52	1	Clip, Fuel Line, Key 2, 6, 8
	149K526	1	Repair Kit, Fuel Pump
	142K371	1	Repair Kit, Carburetor
	142-33	1	Gasket Kit, Carburetor
	148-300	1	Repair Kit, Gas Regulator (Ensign Model F)
	148-522	1	Repair Kit, Gas Regulator (Ensign Model FI)
	148-390	1	Repair Kit, Gas Regulator (Garretson)
	148K609	1	Conversion Kit, Gas-Gasoline (Accessory), Key 1, 2, 5, 6, 8, 9
	148K610	1	Conversion Kit, Gas-Gasoline (Accessory), Key 3, 4, 7
	148K617	1	Conversion Kit, Gas Only

\* - See separate groups for component parts.

# CARBURETOR PARTS GROUP



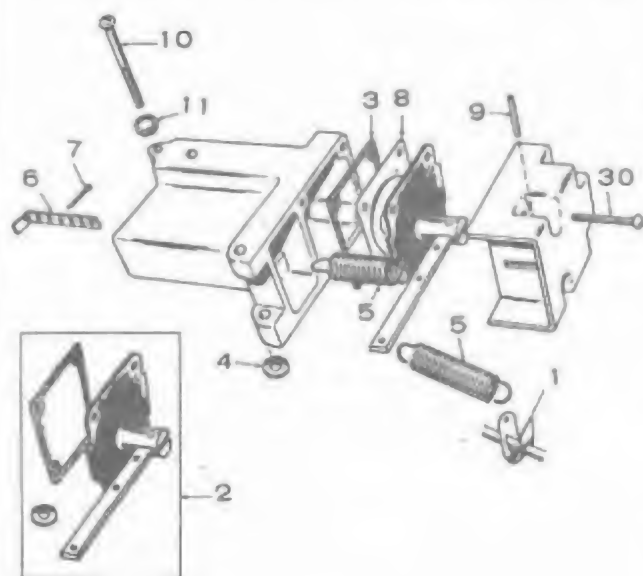
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	CARBURETOR, GASOLINE		
	142A363	1	Key 1, 2, 5, 6, 8, 9, 10
	142A364	1	Key 3, 4, 7
	CARBURETOR, GAS-GASOLINE (Optional)		
	142C367	1	Key 1, 2, 5, 6, 8, 9, 10
	142C366	1	Key 3, 4, 7
1	SCREW, BOWL COVER		
	815-103	1	#10-24 x 1/2"
	815-109	2	#10-24 x 5/8"
2	815-91	2	**Screw, Choke Fly (4-40 x 3/16")
3	FLY, CHOKE		
	142-55	1	Key 1, 2, 5, 6, 8, 9, 10
	142-37	1	Key 3, 4, 7, 11
4	142-205	1	Sleeve Assembly, Choke (Cover)
5	SHAFT ASSEMBLY, CHOKE		
	142-217	1	Key 1, 2, 5, 6, 8, 9, 10
	142-183	1	Key 3, 4, 7
6	142-39	1	**Shaft, Float
7	142-31	1	*Gasket, Body to Bowl
8	148A17	2	*Gasket, (1) Float Valve Seat, (1) Main Adj. Needle Retainer
9	142-49	1	**Valve & Seat Assembly
10	142-32	1	*Gasket, Nozzle
11	142-285	1	Nozzle Assembly
12	142-361	1	Float & Lever Assembly, (Gasoline Models)
13	145A8	1	Lever, Idle Stop
14	142-40	1	**Needle, Idle Adjusting (2 on Gas-Gasoline)
15	142-282	1	Spring, Idle Needle Adjusting (2 on Gas-Gasoline)
16	142A35	1	Spring, Throttle Stop Adjusting Screw
17	812-63	1	Screw, Throttle Stop Adjusting (#6-32 x 1/2")
18	815-72	2	**Screw, Throttle Fly (#4-40 x 1/4")
19	142-369	1	Fly, Throttle
20	142-368	1	**Shaft Assembly, Throttle
21	142-370	1	Nut & Jet, Nozzle
22	142-46	1	Retainer, Main Adj. Needle

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
23	142-206	1	*Packing, Main Adj. Needle
24	142-45	1	Retainer, Main Adj. Needle Packing
25	516A27	1	Pin, Main Adjusting Needle
26	142A41	1	**Needle, Main Adjusting
27		1	Body Assy. (Not Sold Separate)
28	505-53	1	Plug, Gas Inlet
29	142-42	1	Needle Assembly (Includes Packing, Nut & Retainer)
30	142-343	2	Bushing, Throttle Shaft
31	870-53	1	Nut, Throttle Stop
32	813-102	1	Screw, Throttle Stop Clamp
34	148A38	1	Nut, Hex (3/8-32) Float Lock Ret. (Gas-Gasoline Models)
35	148A135	1	Lock Assembly, Float (Gas-Gasoline Models)
36	148B126	1	Adapter, Carburetor (Gas-Gasoline Models)
37	148A22	1	Gasket, Adapter Mounting (Gas-Gasoline Models)
38	148A131	1	Screw, Adapter Adjusting (Gas-Gasoline Models)
39	148A10	1	Spring, Adapter Adjusting Screw (Gas-Gasoline Models)
40	502-34	1	Elbow, Idle Line to Adapter (Gas-Gasoline Models)
41	149A30	1	Line, Idle Fuel (Gas-Gasoline Models)
42	148A8	1	Lock, Choke (Gas-Gasoline Models) Key 3, 4, 7
43	518-75	1	Screw, Choke Lock (Gas-Gasoline Models) Key 3, 4, 7
44	502-74	1	Elbow, Inverted, Adapter Gas-Gasoline Models)
46	509-91	1	Seal, "O" Ring
	142-33	1	**Gasket Kit, Carburetor (Includes Parts Marked *)
	142K371	1	Repair Kit, Carburetor (Includes Parts Marked **)

\* Parts contained in Gasket Kit #142-33.

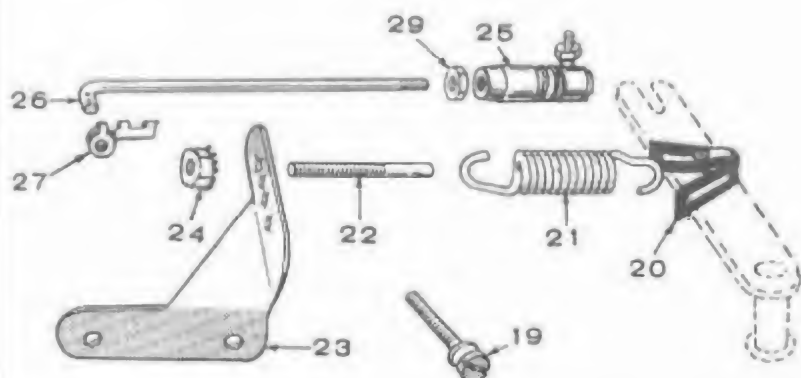
\*\* Parts contained in Repair Kit #142K371.

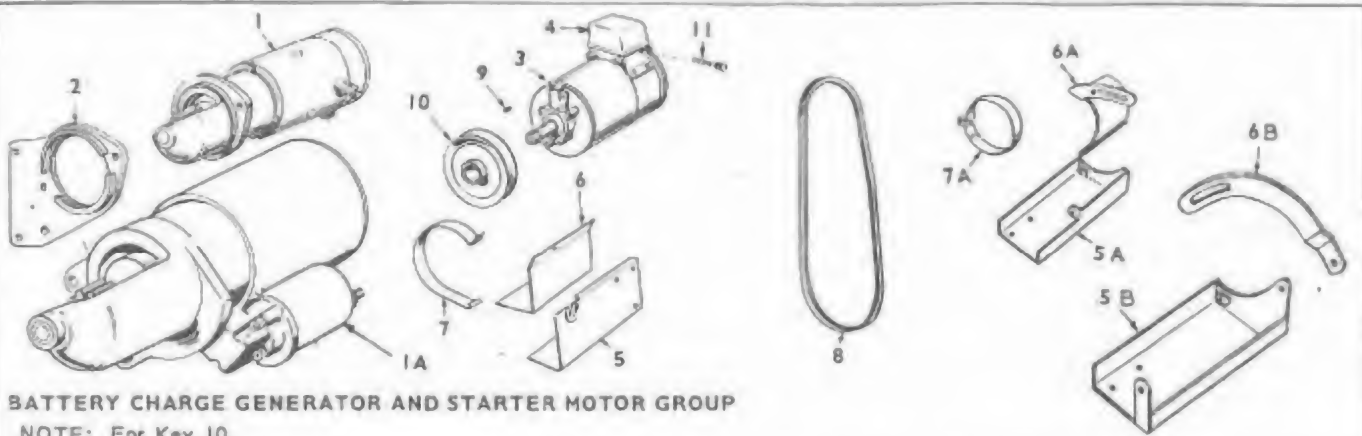
# VACUUM SPEED BOOSTER, GOVERNOR, AND MUFFLER GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	150K433	1	Kit, Vacuum Speed Booster Replacement (Includes Ext. Spring & Mtg. Gasket)
1	150A430	1	Bracket, Spring to Governor Link
2	150K434	1	Kit, Diaphragm Replacement (Includes Gaskets)
3	150A668	1	Gasket, Diaphragm Plate
4	150A425	1	Gasket, Booster to Manifold
5	150A366	2	Spring, Internal & External
6	150A376	1	Bracket, Internal Spring Adj.
7	516-39	1	Pin, Cotter (3/32 x 5/8") Adj. Bracket
8	150A666	1	Plate, Diaphragm
9	516A85	1	Pin (3/32 x 3/4") Diaphragm Lever Pivot
10	813-110	2	Screw (10-32 x 2") - Vacuum Booster Mounting
11	853-8	2	Washer, Lock (#10)
12	155B484	1	Muffler, Exhaust, Key 2, 6, 8
13	155B76	1	Muffler, Exhaust, Key 1, 3, 4, 5, 7, 9, 10
14	155B491	1	Tubing, Flexible Exhaust (36")
15	505-333	1	Elbow, Street, Exhaust Outlet, Key 2, 6, 8
16	505-30	1	Coupling (Pipe 1") Exhaust, Key 1, 3, 4, 5, 7, 9, 10
17	155A295	1	Plate, Exhaust Wall, Key 3, 4, 7, 10
18	505-4	1	Nipple, Exhaust (1-1/2 x Close), Key 2, 6, 8
19	150A136	1	Screw, Governor Sensitivity Adj. - Prior to Spec D
20	150A678	1	Clip, Governor Sensitivity Adj.
21	150A98	1	Spring, Governor
22	150A96	1	Stud, Governor Speed Adjustment
23	150A40	1	Bracket, Governor Spring
24	870-131	1	Nut, Kaps, Governor Speed Adj.
25	150A639	1	Joint, Ball
26	150A629	1	Link, Governor Arm to Carburetor (Note: If old link fastens by a cotter pin, use Clip #518-6)
27	518-6	1	Clip, Rod End, Begin Spec C
28	505-138	1	Coupling, Reducer (1-1/4" x 1), Utility Models
29	870-53	1	Nut, Hex (10-32)
30	815-148	4	Screw (8-32 x 7/8") - Cover Mounting

NOTE: Reference 1 through 11 for Key 1, 2, 3, 4, 5, 6, 7.





### BATTERY CHARGE GENERATOR AND STARTER MOTOR GROUP

NOTE: For Key 10.

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	★MOTOR ASSEMBLY, STARTING		
1	191C150	1	Bendix Drive - Prior to Spec J
1	191C511	1	Bendix Drive - Begin Spec J
1A	191D790	1	Solenoid Shift - Optional Equipment
2	FLANGE, STARTER MOUNTING		
	191C129	1	Prior to Spec J
	191C508	1	Begin Spec J
3	★GENERATOR ASSEMBLY, CHARGE		
	191C159	1	Prior to Spec F - Includes Voltage Regulator (Less Pulley)
	191A277	1	Begin Spec F - Includes Pulley & Fan (Less Voltage Regulator)
4	REGULATOR, VOLTAGE		
	191-386	1	Prior to Spec F
	191A278	1	Begin Spec F
5	191C155	1	Bracket, Charge, Generator Mounting - Prior to Spec D
5A	191B240	1	Bracket, Charge Generator Mounting - Spec D Only

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
5B	191C279	1	Bracket, Charge Generator Mounting - Begin Spec F
6	191B156	1	Bracket, Charge Generator Adj. - Prior to Spec D
6A	191B239	1	Bracket, Charge Generator Adj. - Spec D Only
6B	191C280	1	Bracket, Generator Adj. - Begin Spec F
	BAND, CHARGE GENERATOR MOUNTING		
7	191A157	1	Prior to Spec D
7A	191A242	1	Spec D Models Only
8	511-51	1	Belt, Charge Generator Drive
9	515-105	1	Key, Charge Generator Pulley
10	191A164	1	Pulley, Charge Generator Driven - Prior to Spec F
11	321-94	1	Fuse, 5 Amp. - Prior to Spec F

★ See separate group for component parts.

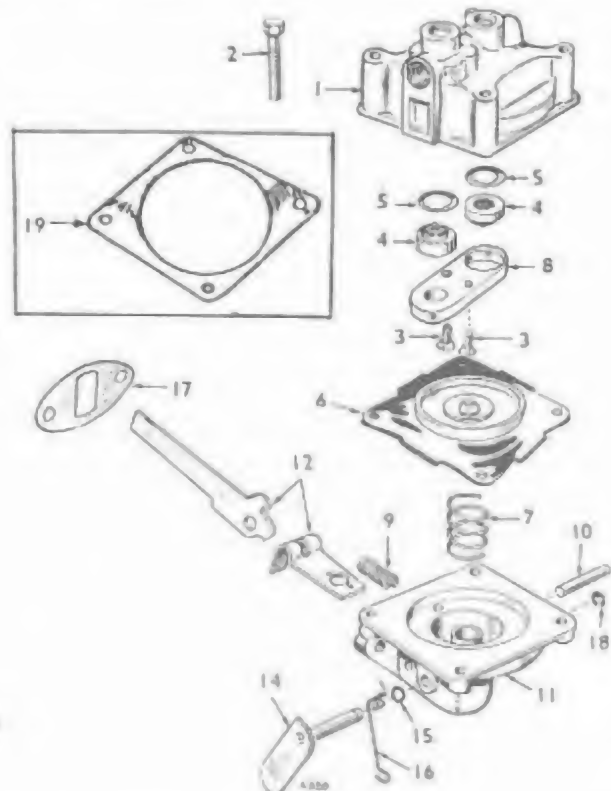
\* For generator components, check nameplate and contact nearest dealer.

### FUEL PUMP PARTS GROUP

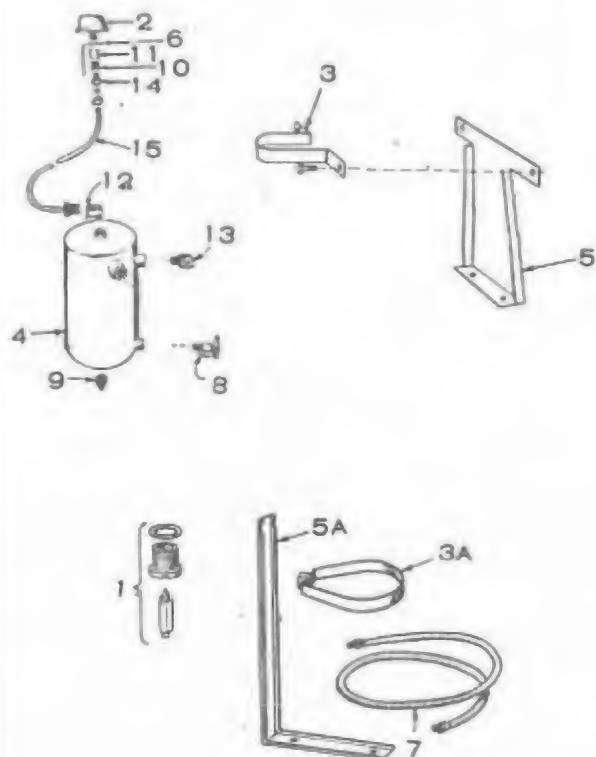
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	149D693	1	Pump, Fuel (Illustrated in Fuel System Group)
	149K526	1	Repair Parts Kit (Includes Parts Marked *)
			Body, Not Sold Separately
1	SCREW, MACHINE		
	815-148	2	#8-32 x 7/8"
	815-150	2	#8-32 x 1"
3	815-147	2	Screw, Phillips Self Tapping, #6-32 x 5/8", Valve Retainer
4	149-96	2	*Valve and Cage
5	149A95	2	*Gasket, Valve
6	149A582	1	*Diaphragm Assembly
7	149A672	1	*Spring
8	149A539	1	Retainer, Valve Cage
9	149A675	1	*Spring
10	516A113	1	Pin, Rocker Arm
11		1	Body, Not Sold Separately
12	149-710	1	Link and Arm, Rocker (Only as a Set)
14	149A551	1	Lever, Primer
15	509-65	2	Seal, "O" Ring
16	149A404	1	Spring, Primer Lever
17	149A3	1	*Gasket, Pump Mounting
18	518-129	1	Ring, Retainer, Primer Lever
19	149A858	1	★Gasket, Diaphragm - Lower Side

\* - Parts in Repair Kit.

★ - Used on some models to prevent air lock.



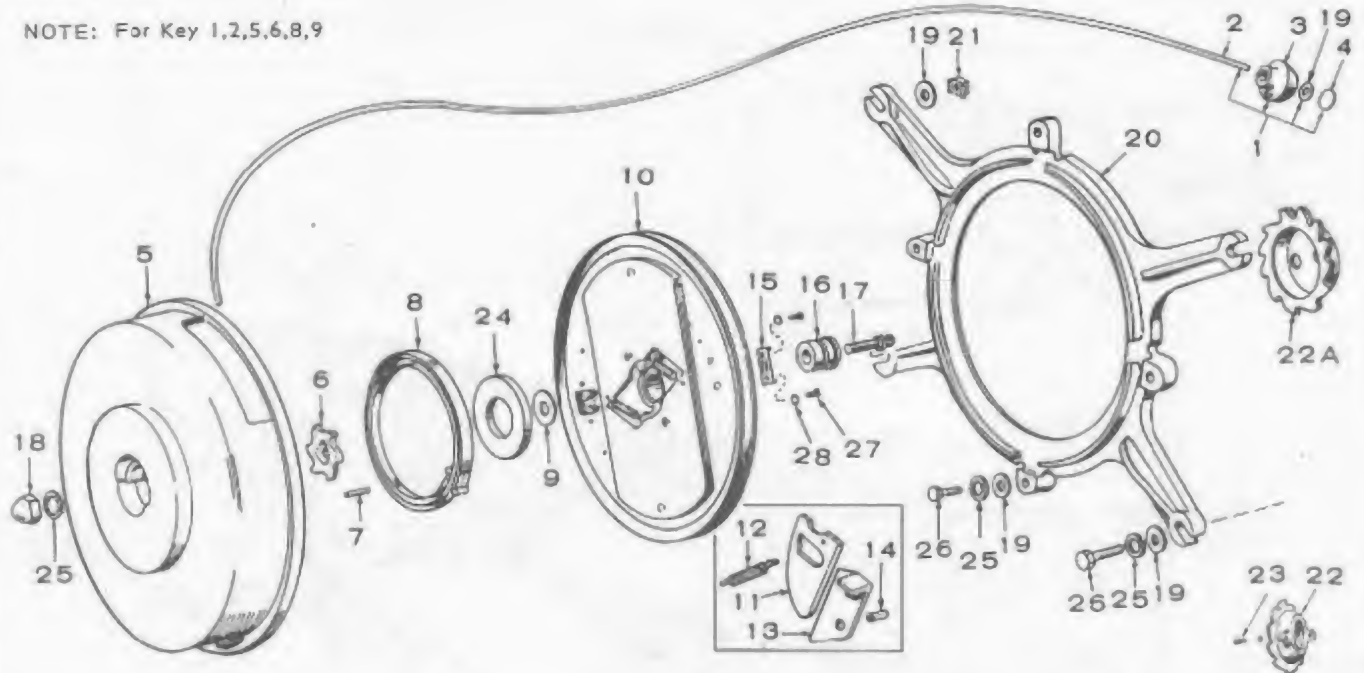
# RESERVOIR (DAY) TANK GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	TANK KIT, RESERVOIR (DAY)		
	159K591	1	One Quart
	159K942	1	Two Quart
1	142-356	1	Valve, Fuel, Carburetor Fuel Inlet
2	159-41	1	Cap, Vent
	BAND, TANK MOUNTING		
3	159A121	1	Plants where Mounting Bracket Mounts to Control Box (One Quart)
3A	159A556	1	Plants where Mounting Bracket Mounts Under Generator Foot (One Quart)
3A	159A936	1	Plants where Mounting Bracket Mounts Under Generator Foot (Two Quart)
4	TANK, RESERVOIR		
	159B294	1	One Quart
	159B746	1	Two Quart
	BRACKET, RESERVOIR TANK MOUNTING		
5	159B302	1	Mounts to Control Box
5A	159A612	1	Mounts Under Generator Foot
6	415A55	1	Bracket, Vent Cap
7	LINE, FUEL, FLEXIBLE		
	501B5	1	18" Long
	501A7	1	24" Long
8	504-86	1	Valve, Shut-off
9	505-57	1	Plug, Tank Drain
10	505-16	1	Bushing, Reducer (3/8 x 1/8")
11	505-28	1	Coupling
12	502-20	1	Elbow, Street (90°)
13	502-24	1	Elbow (90°)
14	502-116	1	Connector
15	159A345	1	Tubing, Copper (5/16" x 12')

# READI-PULL STARTER GROUP

NOTE: For Key 1,2,5,6,8,9

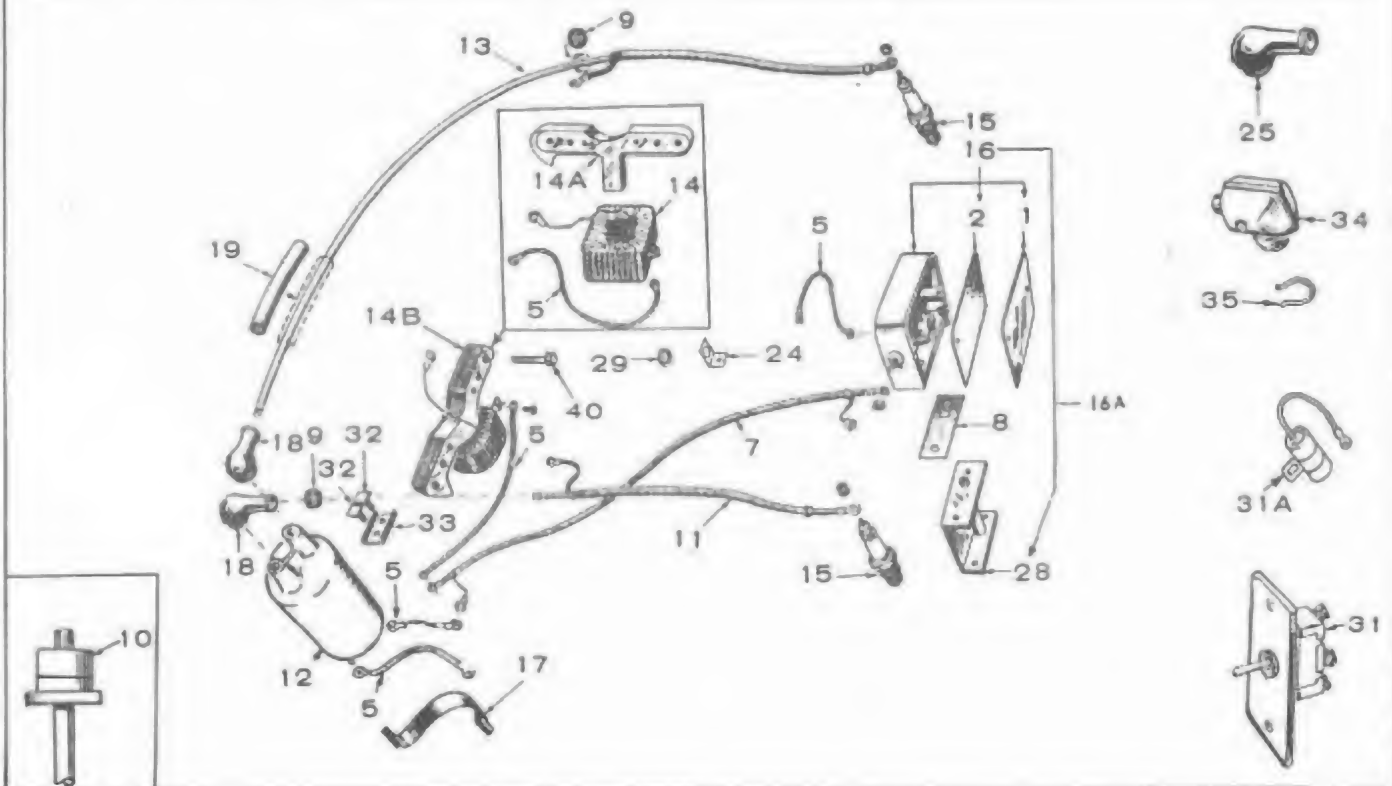
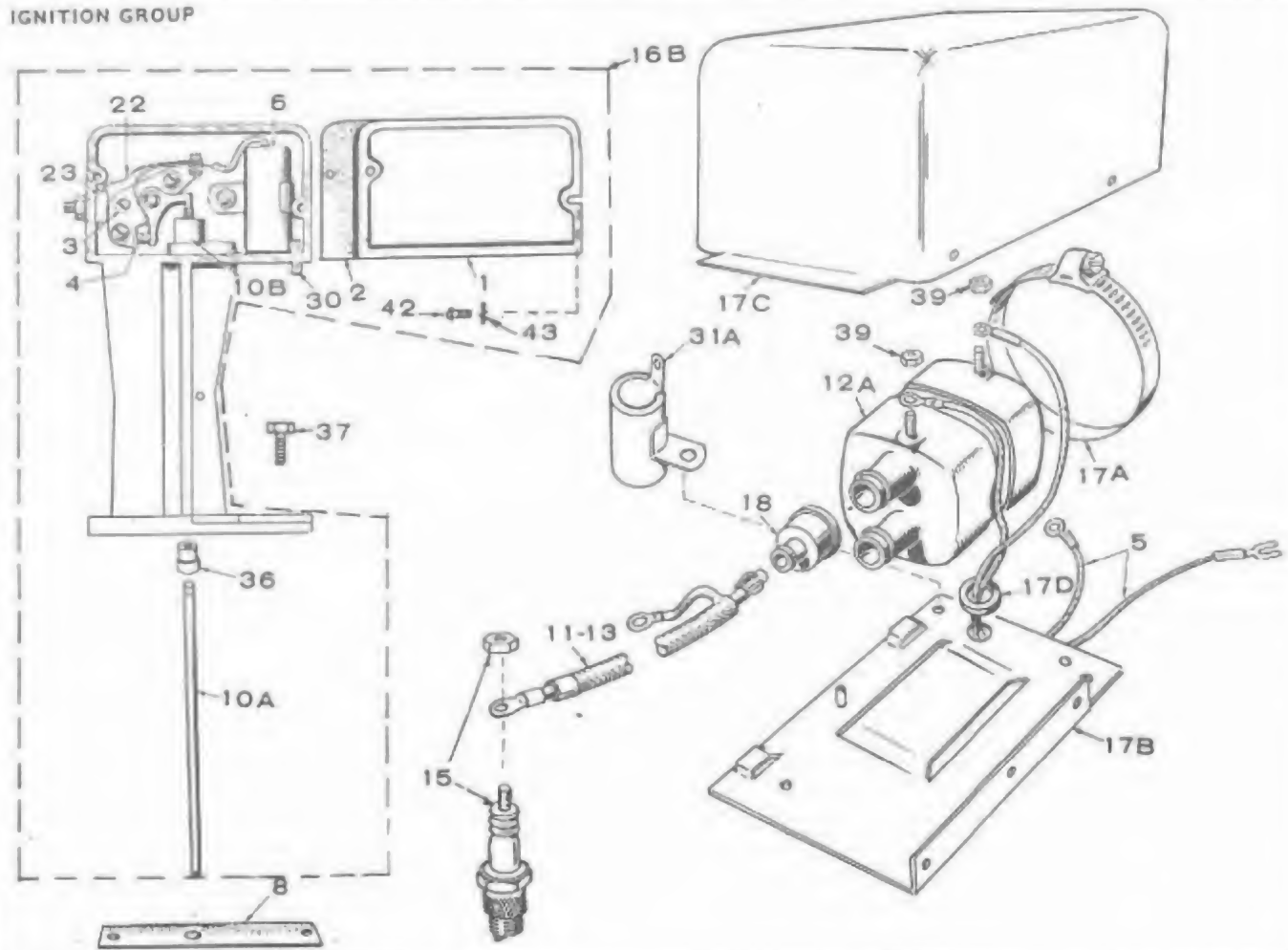


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
STARTER KIT - COMPLETE - INCLUDES MOUNTING RING & RATCHET WHEEL			
	192K215	1	Prior to Spec D
	192K325	1	Begin Spec D
1	192A45	1	Rope & Grip Assembly
2	192A43	1	Rope, Starter, Less Grip (83")
3	192A44	1	Grip, Starter Rope - Rubber
4	517A25	1	Plug, Starter Rope Grip
5	192C152	1	Cover, Starter
6	192A153	1	Wheel, Cog-Anti-Backlash
7	516-138	1	Pin (3/16 x 5/8") Recoil Spring
8	192A39	1	Spring, Recoil
9	526A123	1	Washer, Thrust (Sheave Bushing to Cover)
10	192B180	1	Sheave, Rope (Includes Parts Marked *)
11	192A172	2	*Pawl
12	192A165	2	*Spring, Pawl
13	192A168	2	*Arm, Ratchet
14	516-110	4	*Pin, Roll (5/16 x 1/2") - (2) Ratchet Arm, (2) Pawl
15	192A167	1	*Clamp, Rope
16	192A163	1	Bearing, Sheave Hub (Bronze)
17	192A323	1	Capscrew (3/8-16 x 1-1/2")
18	870-138	1	Nut, Bushing to Cover Screw
19	WASHER, FLAT		
	526A180	4	Starter to Mounting Ring
	526A169	1	Starter Rope Grip
	526-130	4	Starter Ring to Blower Housing (1/16" Thick)
	526-158	4	Starter Ring to Blower Housing (1/8" Thick)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
20	192C186	1	Ring, Starter to Blower Housing Mounting
21	870-110	4	Nut, Speed Grip, Starter Ring to Blower Housing
WHEEL, RATCHET			
22	192A170	1	Prior to Spec D
22A	192B309	1	Begin Spec D
23	192A218	2	Capscrew (Socket Hd.) Ratchet Wheel to Flywheel - Prior to Spec D
24	526-168	1	Washer, Recoil Spring Retainer (Later Model Starters Only)
25	WASHER, LOCK		
	850-50	1	Cover Nut
	850-40	4	Starter Ring to Blower Housing
	850-40	4	Starter to Mounting Ring
26	SCREW, HEX CAP		
	800-7	4	Starter Ring to Blower Housing
	815-137	4	Starter to Mounting Ring
27	815-137	2	*Screw, Hex Cap - Rope Clamp Mounting
28	526-15	2	*Washer, Flat - Rope Clamp Mounting

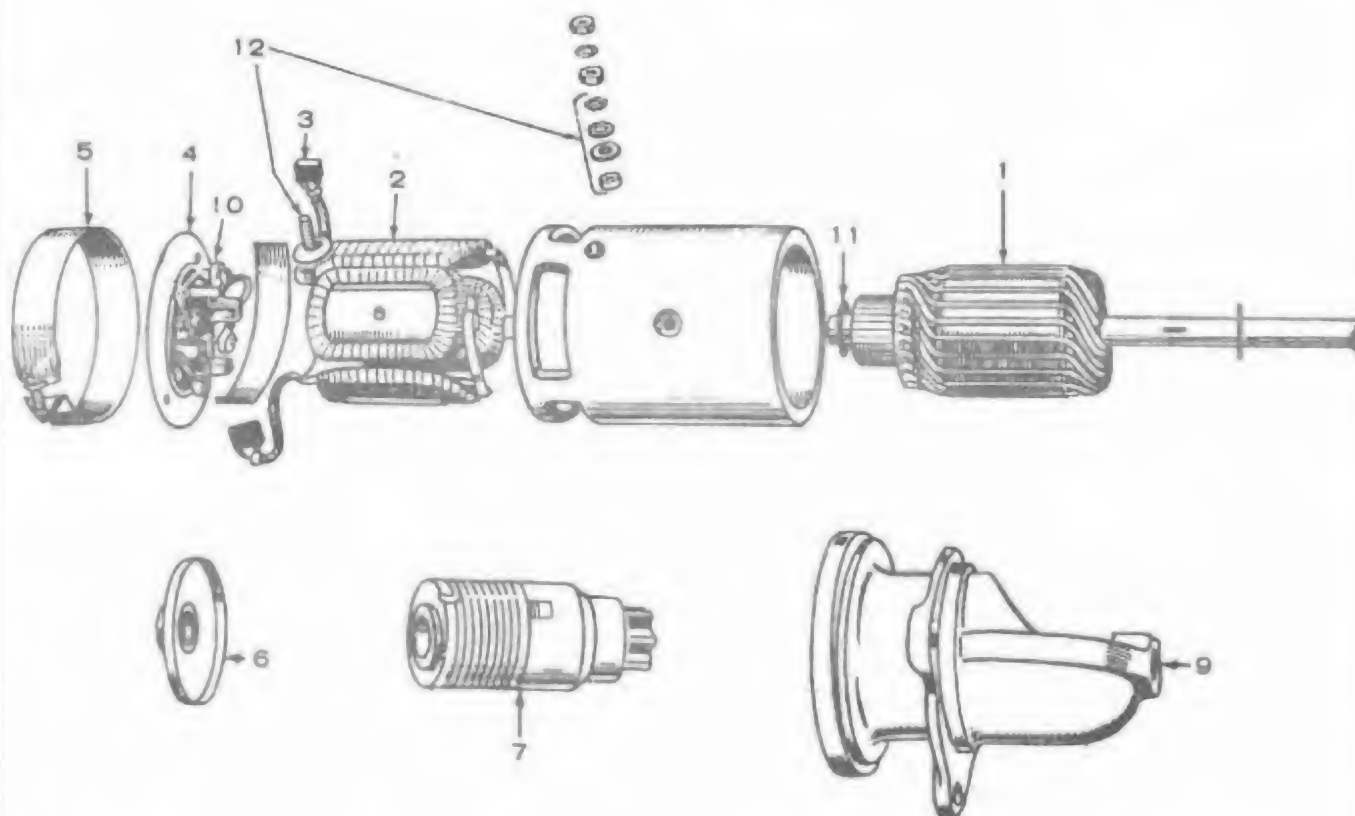
\* - Included in #192B180 Rope Sheave Assembly.

# IGNITION GROUP



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	160A930	1	Cover, Breaker Box
2	160A150	1	Gasket, Breaker Box Cover
3	160A75	1	Pivot, Breaker Arm
4	160A2	1	Point Set, Breaker
5	334-28	1	Lead (4ft. Piece of Bulk Wire)
6	312A69	1	Condenser, Breaker Box (.3 Mfd.)
7	336A507	1	Lead, Breaker Box to Terminal Block (Shielded) Prior to Spec J
8	GASKET 160A43 160A43	1 1	Breaker Box Mounting Breaker Box Spacer Mounting, Key 3, 4, 7, 10 Prior to Spec J
9	508A5	2	Grommet, Spark Plug Cable (In Blower Housing) Prior to Spec J
10	PLUNGER ASSEMBLY, BREAKER (Includes Plunger, Diaphragm & Guide)		
	160A262	1	Key 1, 2, 5, 6, 8, 9 Prior to Spec J
	160A268	1	Key 3, 4, 7, 10 Prior to Spec J
	160A262	1	All Gas & Gas-Gasoline Plts.
10A	160A723	1	Plunger, Breaker, Begin Spec J
10B	160A1143	1	Diaphragm, Plunger
11	CABLE, SPARK PLUG (SHIELDED) RIGHT		
	167A1112	1	9" (Repl. 167A1307) Prior to Spec J
	167A1467	1	13", Begin Spec J
12	160C792	1	Coil, Ignition Prior to Spec J
12A	166C346	1	Coil, Ignition, Begin Spec J
13	CABLE, SPARK PLUG (SHIELDED) LEFT		
	167A1289	1	23", Prior to Spec J
	167A1468	1	21-1/2", Begin Spec J
14	160A282	1	Coil, Magneto Stator, Key 1, 2, 5, 6, 8, 9
14A	160A281	1	Pole Shoe, Magneto Stator Key 1, 2, 5, 6, 8, 9
14B	160K722	1	Stator Assembly, Magneto (Incl. Coil & Pole Shoe) Key 1, 2, 5, 6, 8, 9
15	167-241	2	Plug, Spark
16	160A257	1	Box Assy., Ignition Breaker (Complete) Key 1, 2, 5, 6, 8, 9, Prior to Spec J
16	160A257	1	Box Assy., Ignition Breaker - All Gas & Gas-Gasoline Plants
16A	160A258	1	Box Assy., Ignition Breaker (Complete) Key 3, 4, 7, 10, Prior to Spec J
16B	160A963	1	Box Assy., Ignition Breaker (Complete) Begin Spec J (Except Gas & Gas-Gasoline Plants)
17	160A488	1	Clamp, Ignition Coil, Prior to Spec J
17A	503P514	1	Clamp, Ignition Coil, Begin Spec J
17B	166B383	1	Bracket, Ignition Coil, Begin Spec J

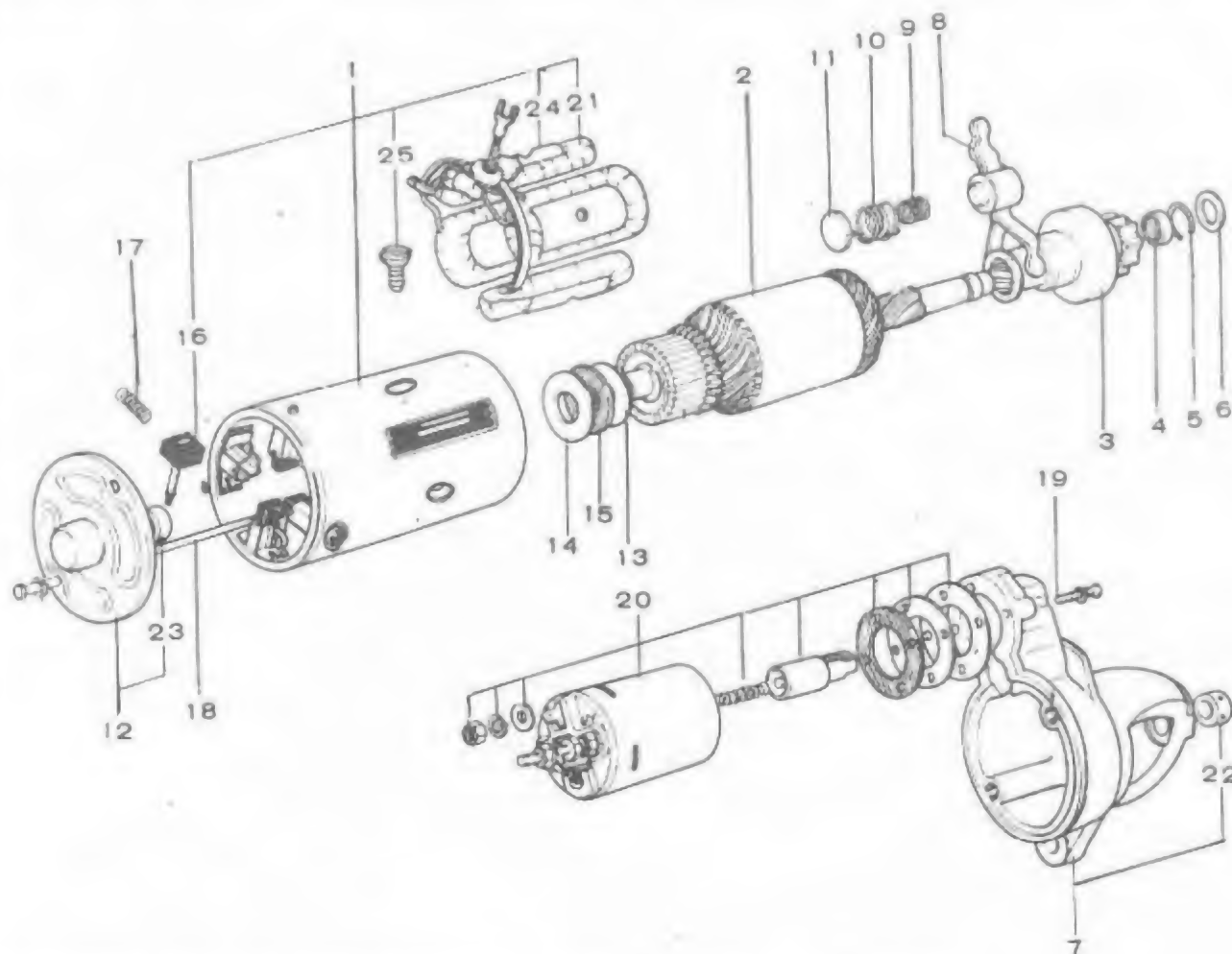
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
17C	166C385	1	Cover, Ignition Coil, Begin Spec J
17D	508P114	1	Grommet, Ignition Coil Mounting Bracket, Begin Spec J
18	160A558	2	Nipple, Ignition Coil Rubber
19	503-92	1	Sleeve, Rubber, Spark Plug Lead
22	160A428	1	Strap, Point Set to Breaker Box Terminal Block
23	160A349	1	Block & Terminal Assembly, Breaker Box
24	332A273	1	Clip, Magneto Lead, Key 1, 2, 5, 6, 8, 9
25	166P250	2	Cover, Spark Plug (Optional)
28	160A246	1	Spacer, Breaker Box, Key 3, 4, 7, 10, Prior to Spec J
29	508A2	1	Grommet, Stator Lead, Key 1, 2, 5, 6, 8, 9
30	160A261	1	Wick, Breaker Box
31	308A165	1	Switch, Remote Start-Stop (Optional), Key 3, 4, 7
31A	CONDENSER (.1 MFD.) IGNITION COIL SUPPRESSION, KEY 3, 4, 7, 10		
	312A58	1	Prior to Spec J
	312A162	1	Begin Spec J
32	332A284	2	Screw, Terminal Block Mounting, On Block Housing, Prior to Spec J
33	332A272	1	Block, Terminal, On Block Housing, Prior to Spec J
34	167A67	2	Shield, Spark Plug (Includes Clamp & Shield)
35	167A64	2	Clamp, Spark Plug Shield
36	160A929	1	Bushing, Breaker Box, Begin Spec J
37	SCREW, BREAKER BOX MOUNTING		
	815P353	2	Prior to Spec J
	815P357	2	Begin Spec J
38	160A931	1	Guide, Plunger - Begin Spec J
39	870-53	2	Nut (10-32) - Coil Leads
40	815-193	2	Screw (1/4-20 x 1-3/8"), Stator Mounting, Key 1, 2, 5, 6, 8, 9
41	812-59	1	Screw (#6-32 x 1/4") Stator Primary Lead, Key 1, 2, 5, 6, 8, 9
42	812-77	2	Screw (8-32 x 3/8") - Breaker Box Cover Mounting
43	850-25	2	Washer, Lock (#8)
	812-153	1	Screw (1/4-20 x 1") Ignition Coil, Prior to Spec J
	160C764	1	Bracket, Coil Mounting (Used Only where Coil is on LH Side of Generator (Optional), Prior to Spec J
	160C763	1	Bracket, Coil Mounting (Used Only where Coil is on RH Side of Generator (Optional), Prior to Spec J



STARTING MOTOR PARTS GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
MOTOR ASSEMBLY, STARTING			
	191C150	1	Prior to Spec J
	191C511	1	Begin Spec J
1	191-517	1	Armature
2	191-1017	1	Coil Assy. Pkg., Field
3	191-513	1	Brush Set, Service
4	191-1018	1	Head Assy., Commutator End
5		1	Band, Cover (Not Sold Separately)
6	191-1019	1	Bearing Assy., Intermediate
7	191P271	1	Drive Assy., Bendix

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
9	191-735	1	Bearing, Drive End
10	191-1020	1	Spring, Brush (Set of 4)
11	191-1021	1	Washer Armature Thrust (pkg.) Use as required.
12	191-1022	1	Stud, Terminal (pkg.)



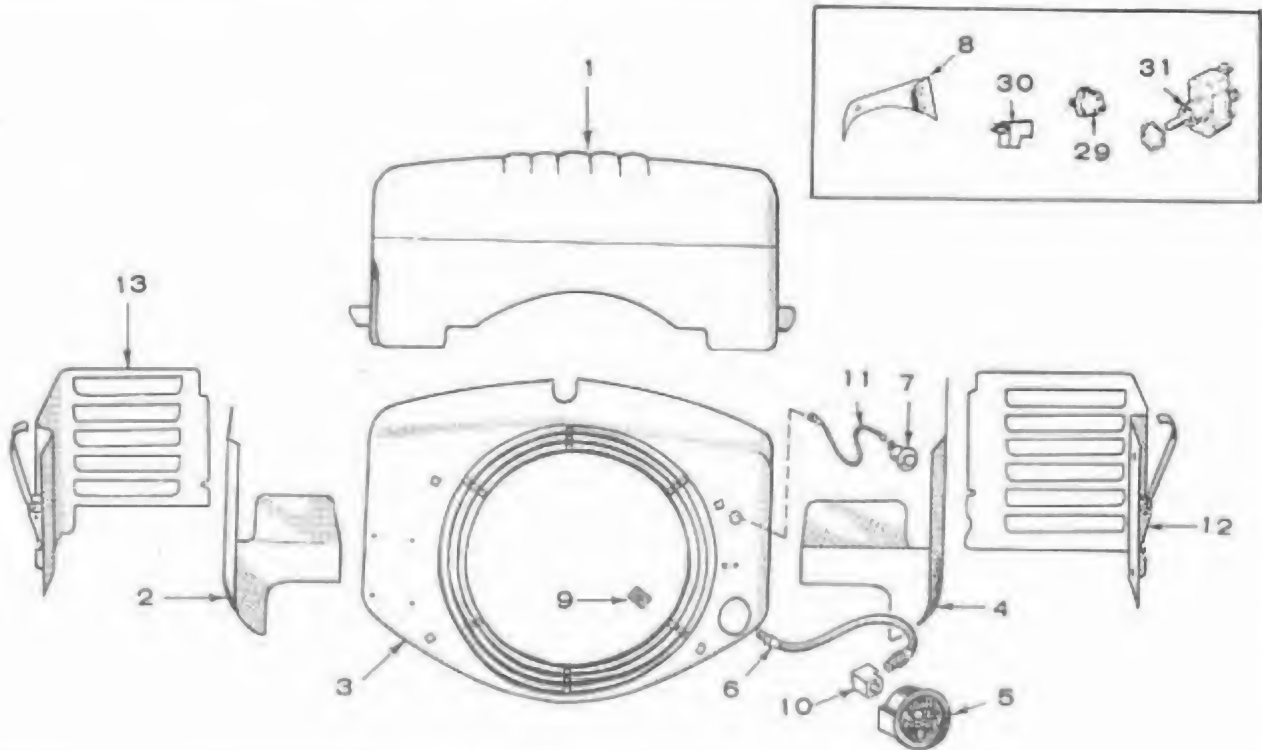
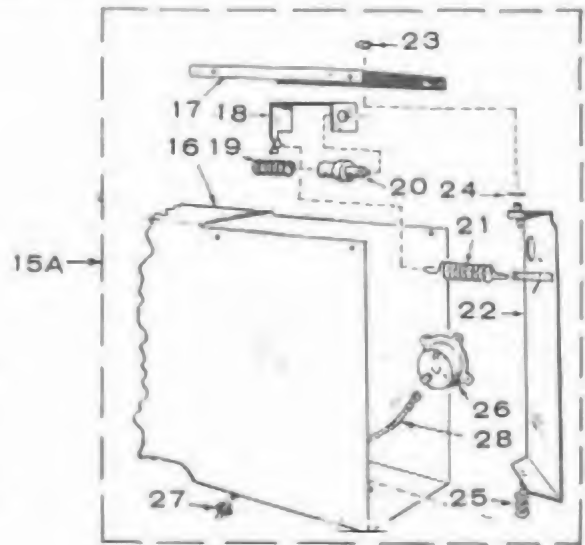
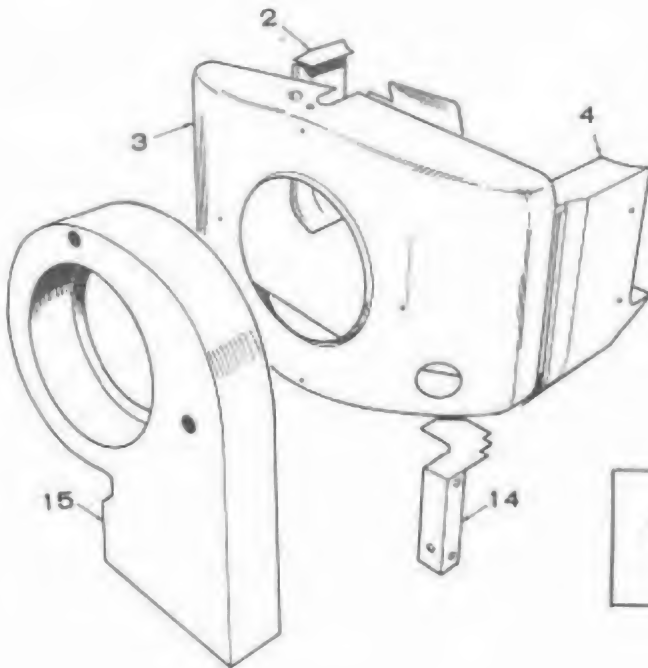
# STARTING MOTOR PARTS GROUP—SOLENOID SHIFT (Optional)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	191D790	1	Motor Assembly, Starting-Comp.
1	191-806	1	Yoke Assembly (Frame)- Includes Parts Marked *
2	191-743	1	Armature
3	191-744	1	Clutch, Starter
4	191-745	1	Stop, Pinion
5	191-746	1	Ring
6	191-807	1	Washer, Plain
7	191-808	1	Bracket Assembly, Front
8	191-749	1	Lever Assembly
9	191-750	1	Spring, Lever
10	191-751	1	Spring, Lever
11	191-752	1	Holder, Spring
12	191-809	1	Bracket Assembly, Rear
13	191-754	1	Washer, Plain

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
14	191-755	1	Washer, Plain
15	191-756	1	Washer, Insulator
16	191-757	4	*Brush
17	191-758	4	Spring, Brush
18	191-759	2	Bolt, Through
19	191-760	3	Screw, Machine P.H.
20	191-761	1	Switch Assembly, Solenoid
21	191-762	1	*Coil Assembly, Field
22	191-763	1	Bearing, Front
23	191-764	1	Bearing, Rear
24	191-765	4	*Pole Shoe
25	191-766	4	*Screw, Pan Head

\* Included in Yoke Assembly.

# AIR HOUSING AND OPTIONAL AIR SHUTTER GROUP

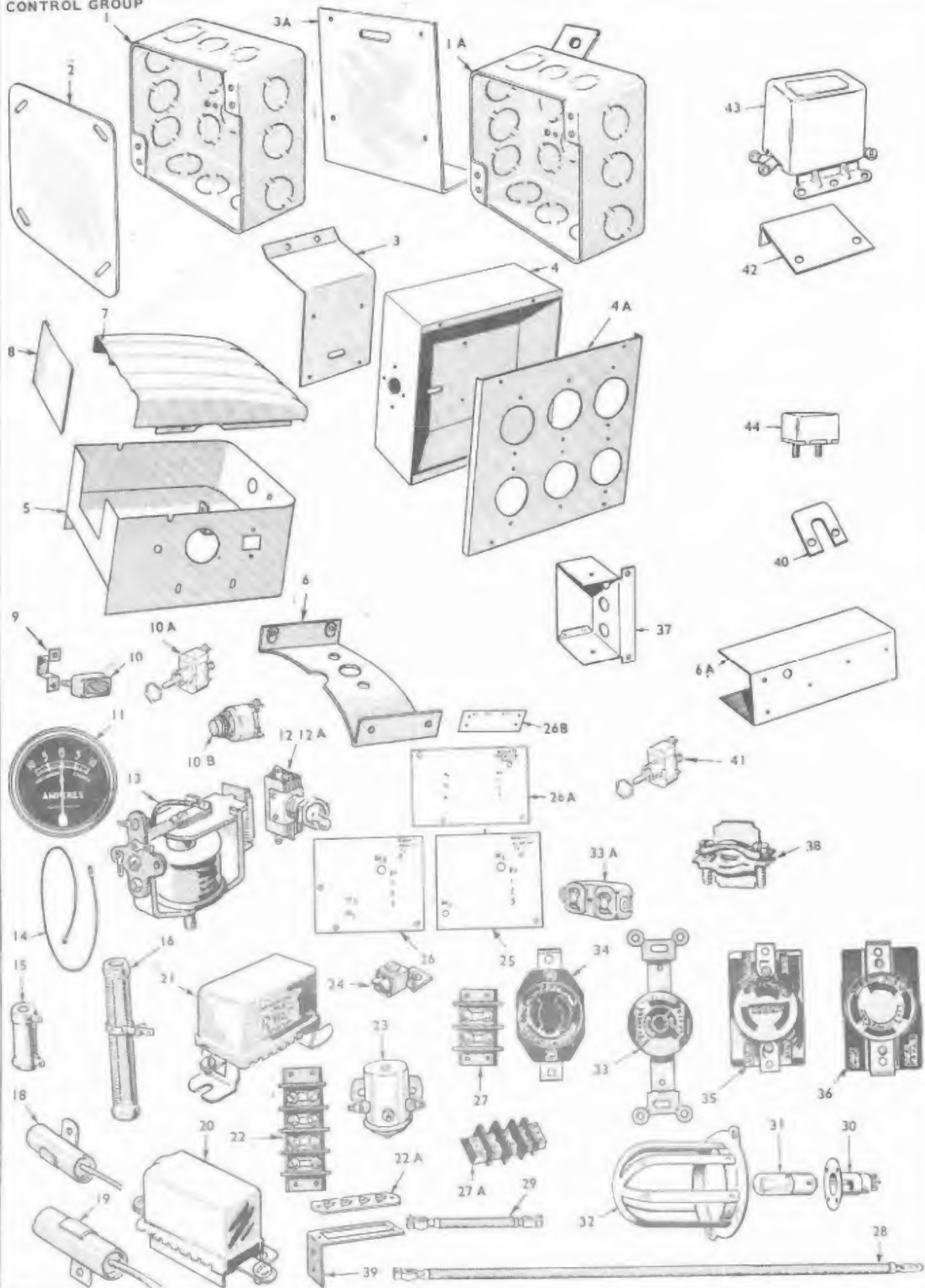


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	405C1013	1	Hood, Engine
2	134D589	1	Housing, Cylinder Air, Left (#1 Cylinder)
3	HOUSING, BLOWER 134D569	1	Pressure Cooled Plants, Key 1, 2, 3, 4, 5, 6, 7, 8, 9, Prior to Spec J
	134D1566	1	Pressure Cooled Plants, Key 1, 2, 3, 4, 5, 6, 7, 8, 9, Begin Spec J
	134D594	1	Vacu-Flo Cooled Plants, Key 3, 4, 7, Prior to Spec J
	134C2248	1	Vacu-Flo Cooled Plants, Key 3, 4, 7, Begin Spec J
	134D705	1	Key 10, Prior to Spec J
	134D1574	1	Key 10, Begin Spec J
4	HOUSING, CYLINDER AIR, RIGHT (#2 CYLINDER) 134D588	1	Key 1, 2, 3, 4, 5, 6, 7, 8, 9
	134D674	1	Key 10
	134C2134	1	Engines With Optional Solenoid Shift Starting Motor-Key 10
5	193P5	1	Gauge, Oil Pressure
6	501A4	1	Line, Flexible Oil
7	313P18	1	Button, Stop, Key 1, 2, 5, 6, 8, 9
8	160B500	1	Bracket, Ignition Timing (Vacu-Flo Cooled Plants) Key 3, 4, 7, Prior to Spec D
9	NUT, SPEED GRIP 870-110	4	Key 1, 2, 5, 6, 8, 9 (Readi-Pull Starter Mounting)
	870-110	4	Vacu-Flo Cooled Plants, Key 3, 4, 7 (Air Scroll Mounting)
10	502-5	1	Elbow, Inverted Female, Oil Gauge
11	334-28	1	Lead, Stop (4ft. Piece of Bulk Wire)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
12	134C662	1	Cover, Cylinder #2, Right (NOTE: Not used on Vacu-Flo Cooled Plants)
13	134D663	1	Cover, Cylinder #1, Left (NOTE: Not used on Vacu-Flo Cooled Plants)
14	BAFFLE, AIR 134B670	1	Key 10
	134C2131	1	Engines With Optional Solenoid Shift Starting Motor-Key 10
15	134D564	1	Scroll, Air (Vacu-Flo Cooled Plants) Key 3, 4, 7
15A	134C816	1	Shutter Assembly, Discharge Air (Optional on Vacu-Flo Cooled Plants), Key 3, 4, 7 (Includes Parts Marked **)
16	134D815	1	**Scroll, Air Duct (With Provision for Air Shutter)
17	134B661	1	**Plate, Vernatherm Element Mounting
18	134B660	1	**Bracket, Vernatherm Element
19	134A656	1	**Spring, Vernatherm Element
20	309P85	1	**Element, Vernatherm
21	134A658	1	**Spring, Shutter
22	134A655	1	**Shutter, Circulated Air Control
23	518P74	1	**Ring, Ext. Ret., Shutter Shaft
24	526-102	1	**Washer (Large), Shutter Spacing
25	526-16	3	**Washer (Small), Shutter Spacing
26	309A2	1	**Switch, Hi-Temp. Cut-Off
27	508-31	1	**Grommet, Rubber
28	336A1252	1	**Lead, Hi-Temp. Cut-Off Switch
29	309-10	1	Switch, Low Oil Pressure (Optional)
30	502-58	1	Tee, Oil Line (Optional)
31	308-97	1	Switch, Momentary Contact
32	517-21	1	Plug, Dot Button (7/8" Hole), Key 3, 7
	405B1059	1	Canvass - Anti-Vibration (3-1/4 x 10) Vacu-flo Cooled plants

\*\* - Parts contained in Shutter Assembly.

# CONTROL GROUP

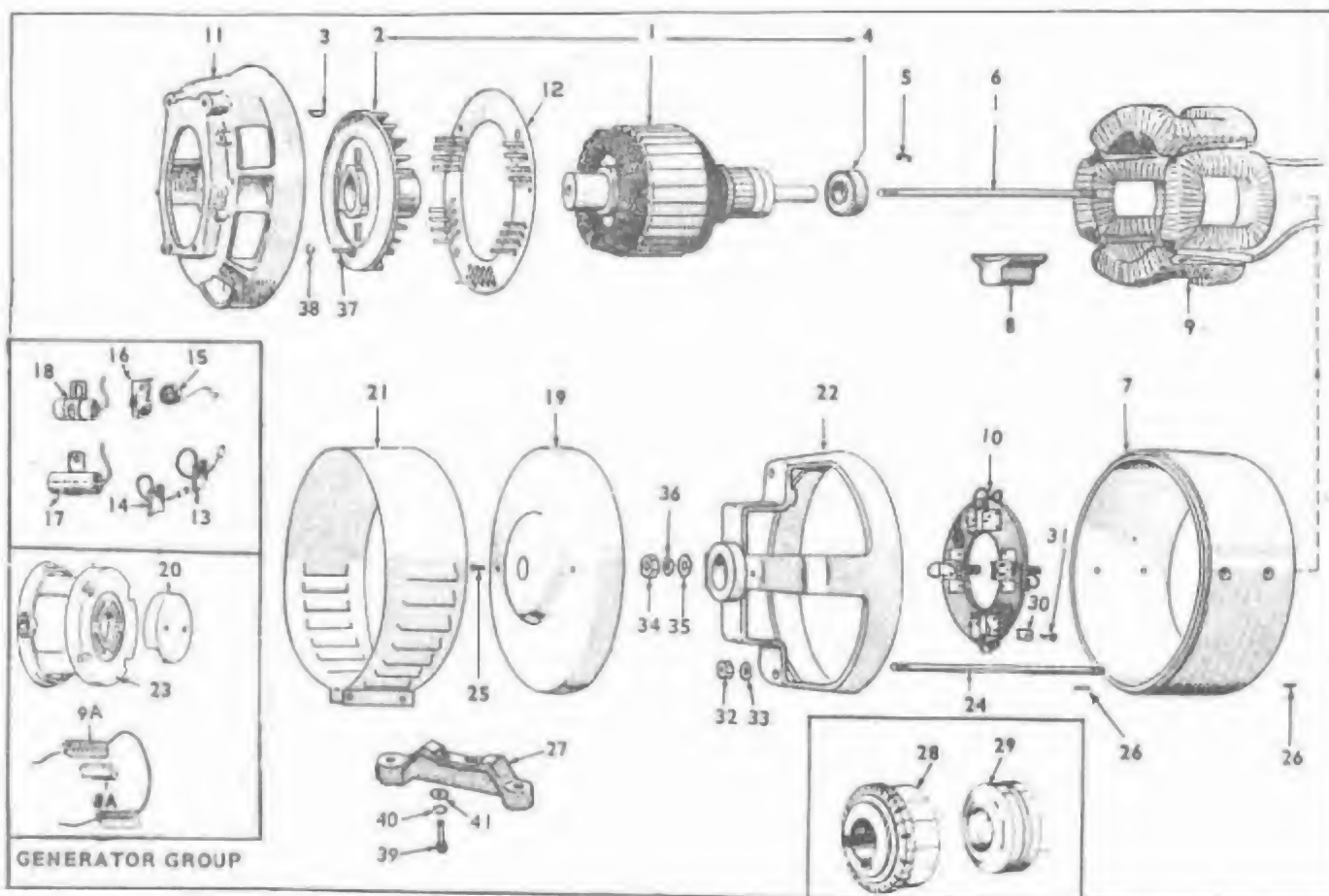


REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	BOX, JUNCTION		
	330-28	1	Key 1, 5
	330-28	1	Key 9, 10 Prior to Spec D
1A	330B47	1	Box, Junction, Begin Spec D (Includes Bracket)
2	330-6	1	Cover, Junction Box, Key 1, 5, 9, 10
	BRACKET, BOX MOUNTING		
3	301C1277	1	Key 1, 5 (Mtg. Junction Box)
	301C1277	1	Key 8 (Mtg. Receptacle Box)
3A	301C1276	1	Bracket, Mounting, Key 2, 6 (Mounting Receptacle Box)
4	BOX, RECEPTACLE		
	301C2112	1	Key 2, 6
	301C1517	1	Key 8
4A	PANEL, RECEPTACLE BOX		
	301B525	1	Key 2, 6 1 Phase, Prior to Serial 683612
	301B1755	1	1 Phase, Begin Serial 683612
	301B1265	1	3 Phase
	301B525	1	Key 8, Prior to Serial 683512
	301B1755	1	Key 8, Begin Serial 683612
5	L	1	Box, Control (Includes Panel & Resistor Bracket)
6	301B1198	1	Bracket, Control Mounting, Key 3, 4, 7
6A	301C1494	1	Bracket, Control Mounting, Key 10
7	COVER, CONTROL BOX		
	301C202	1	Pressure Cooled Plants, Key 3, 4, 7
	301C1244	1	Vacu-Flo Cooled Plants, Key 3, 4, 7
8	301B1271	1	Plate, Control Box End, Vacu-Flo Cooled Plants, Key 3, 4, 7
9	301A974	1	Bracket, Start-Stop Switch, Key 3, 4, 7 (Used with old type Switch Only)
10	308A166	1	Switch, Start-Stop (Includes Mtg. Plate) Key 3, 4, 7, Prior to 2-10-61
10A	308P154	1	Switch, Start-Stop, Begin 2-10-61
10B	308A29	1	Button, Start, Key 10
11	AMMETER, CHARGE		
	302A58	1	Key 3, 4, 7
	302A62	1	Utility Models
12	308-2	1	Switch, Toggle (Manual-Electric Start) Key 3, 4, 7
12A	308-69	1	Switch, Ignition, Key 10
13	307B253	1	Relay, Stop, Key 3, 4, 7
14	LEAD, WIRE		
	336A1124	1	Key 10 (Optional) Battery Charge (Generator to Start Solenoid)
	336A1136	1	Key 10, Choke to Start Solenoid
15	RESISTOR, FIXED		
	304A251	1	Key 3, 4, 7 (30-Ohm, 5 Watt)
	304A344	1	Key 3, 4, 7 (1-Ohm, 24 Watt) 3/4 x 2"
	304A60	1	Key 3, 4, 7, 10 (1.72-Ohm, 25 Watt) 9/16 x 2" (Ignition)
16	RESISTOR, ADJUSTABLE		
	304A175	1	Key 3, 4, 7 (1-Ohm) 3/4 x 4"
	304A110	1	Key 8 (60-Ohm, 50 Watt) 3/4 x 4"
18	CONDENSER (0.1 Mfd.) LOAD TERMINAL SUPPRESSION, KEY 3, 4, 7		
	312A58	1	120 Volt or 240 Volt, 1 Phase
	312A58	2	120/240 Volt, 1 Phase
	312A58	3	120/208 Volt, 3 Phase
	312A58	3	240 Volt, 3 Phase
	312A58	3	120/240 Volt, 1 Phase Reconnectible
19	312A57	1	Condenser (1. Mfd.) Start Solenoid Suppression, Key 3, 4, 7
20	305A1	1	Regulator, Voltage, (Charge Circuit) Key 3, 4, 7
21	RELAY, REVERSE CURRENT		
	307B180	1	Key 3, 4, 7
	307B495	1	Utility Models
22	332A537	1	*Block, Terminal, Remote Control (4 Place) - Later Models

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
22A	332A222	1	*Block, Terminal, Remote Control (4 Place) - Early Models
23	SOLENOID, START		
	307B1046	1	Key 3, 4, 7
	307P367	1	Key 10
24	332-142	As Req.	Terminal, Solderless
25	332A540	1	Strip, Marker (Load Terminal), Key 3, 4, 7 - 120 Volt or 240 Volt, 1 Phase
26	332A539	1	Strip, Marker (Load Terminal), Key 3, 4, 7, 120/240 Volt, 1 Phase
26A	STRIP, MARKER (LOAD TERMINAL) KEY 3, 4, 7		
	332A558	1	120/208 Volt, 3 Phase
	332A541	1	240 Volt, 3 Phase
26B	STRIP, MARKER		
	332A566	1	Key 3, 4, 7 (Remote Control) - Later Models
	332A435	1	Key 3, 4, 7 (Load Terminal), Earlier Models
	332A426	1	Key 10 (Ignition)
27	332A231	1	Block, Terminal (2 Place) Key 3, 4, 7, 120/240 Volt, 1 Phase
27A	BLOCK, TERMINAL		
	332A236	1	Key 3, 4, 7, 3 Phase (3 Place)
	332A254	1	Key 3, 4, 7, 120/240 Volt, 1 Phase, Reconnectible (Load Terminal) - Early Models
	332A406	1	Key 10 (3 Place) Ignition
28	416A77	2	Cable, Battery (28") Key 3, 4, 7
29	416A4	1	Cable, Battery Jumper, Key 3, 4, 7
30	322P21	1	Receptacle, Pilot Lamp, Key 2, 6, 8
31	LAMP, PILOT		
	322-11	1	Key 8
	322-11	1	Key 2, 6
	322-11	1	120 Volt or 120/240 Volt, 1 Phase, 120/240 Volt, 3 Ph.
	322-59	1	240 Volt, 1 Phase, 240 Volt, 3 Phase
32	322A22	1	Guard, Pilot Lamp, Key 2, 6, 8
33	323P195	4	Receptacle, Twistlock, Key 2 (1 Phase), 6 (1 Phase), 8, Prior to Serial 683612
33A	323P184	2	Receptacle, Duplex, Key 2 (1 Phase), 6 (1 Phase), 8, Begin Serial 683612
34	323P23	2	Receptacle, Twistlock, Key 2, 6 (120 Volt or 240 Volt, 1 Phase) & Key 8
35	RECEPTACLE, TWISTLOCK - KEY 2, 6		
	323-11	2	120/240 Volt, 1 Phase
	323-11	3	3 Phase
36	323P91	3	Receptacle, Twistlock, 3 Ph.
37	301B482	1	Box, Resistor Mtg., Key 8
38	331-27	1	Connector, Load Conductor, Key 1, 2, 5, 6
39	332A198	1	Bracket, Mounting (Remote Control Terminal Block) - Earlier Models
40	332A439	1	Jumper, Load Terminal Block
41	308-97	1	Switch, Momentary Contact - Used with Low Oil Pressure Switch (Optional)
42	301A2694	1	Bracket, Relay Mounting - Utility Models
43	307B454	1	Relay, Charge Disconnect - Utility Models
44	320A158	1	Breaker, Circuit - Utility Models

L - Refer to factory giving complete Model, Spec and Serial Number.

\* - Select and Identify from Illustration.



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	*	1	Armature Assembly (Includes Bearing & Blower)
2	205C53	1	Blower, Generator
3	515-6	1	Key, Blower to Crankshaft
4	510A47	1	Bearing (Ball), Armature
5	232A596	1	Clip, Bearing Stop
6	STUD, ARMATURE THROUGH		
			Key 1, 2, 3
	520A491	1	120 Volt or 240 Volt, 1 Phase (7/16 x 14-1/2")
	520A525	1	120/240 Volt, 1 Phase (Reconnectable and Non-Reconnectable) & All 3 Phase (7/16 x 15-7/8")
			Key 4, 5, 6, 7
	520A407	1	120 Volt or 240 Volt, 1 Phase (7/16 x 17-3/4")
	520A595	1	120/240 Volt, 1 Phase (Reconnectable and Non-Reconnectable) & All 3 Phase (7/16 x 19-1/2")
			Key 8, 9, 10
	520A491	1	Prior to Spec D (7/16 x 14-1/2")
	520A534	1	Begin Spec D (7/16 x 16-3/8")
7	FRAME ONLY, GENERATOR (Machined & Drilled, Less Coils & Pole Shoes)		
	210D244	1	Key 1, 2, 3
	210B238	1	Key 4, 5, 6, 7
			Key 8, 9, 10
	210D277	1	Prior to Spec D
	210D309	1	Begin Spec D

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
8	SHOE, POLE, FIELD		
	221A91	4	Key 1, 2, 3 (4-1/2")
	221A90	4	Key 4, 5, 6, 7, (7-1/2")
			Key 8, 9, 10
	221B56	4	Prior to Spec D (4-1/2")
	221B130	4	Begin Spec D (5")
8A	SHOE, INTERPOLE, KEY 8, 9, 10		
	221A47	2	Prior to Spec D
	221A133	2	Begin Spec D
9	*	1	Coil Assembly, Field (Set of 4 Coils)
9A	COIL ASSEMBLY, INTERPOLE (Set of 2 Coils)		
			Key 8
	222A1498	1	Prior to Spec D
	222A1540	1	Begin Spec D
			Key 9, 10
	222A1278	1	Prior to Spec D
	222A1546	1	Begin Spec D
10	RIG ASSEMBLY, BRUSH		
			Key 1, 2, 3, 4
	212C294	1	120 Volt or 240 Volt, 1 Phase
	212C295	1	120/240 Volt, 1 Phase
	212C298	1	120/208 Volt, 3 Phase, 120/240 Volt, 1 Phase, Reconnectable, 120/240 Volt, 3 Phase & 220/380 Volt, 3 Phase
	212C297	1	240 Volt, 3 Phase
			Key 5, 6, 7
	212C293	1	120 Volt, 1 Phase
	212C294	1	240 Volt, 1 Phase
	212C295	1	120/240 Volt, 1 Phase

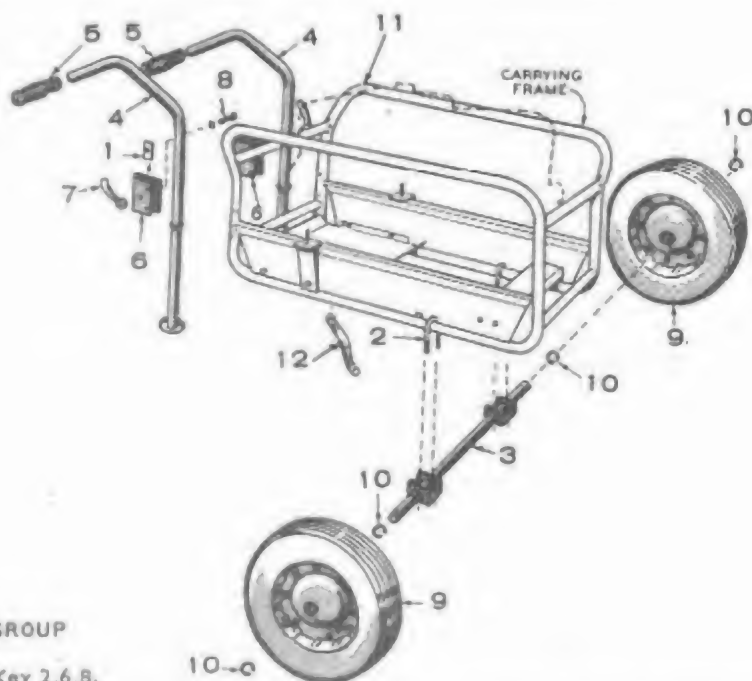
\* - Order by description, giving complete Model, Spec and Serial Number.

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	212C298	1	120/208 Volt, 3 Phase, 120/240 Volt 1 Phase, Reconnectible & 277/480 Volt, 3 Phase
	212C297	1	240 Volt, 3 Phase
	212C236	1	Key 8
	212C237	1	Prior to Spec D
			Begin Spec D
			Key 9, 10
	212C236	1	Prior to Spec D
	212C243	1	Begin Spec D
11	231B1006	1	Adapter, Generator to Engine
12	232B1256	1	Scroll, Air Baffle
13	BRUSH, COMMUTATOR		
			Key 1, 2, 3, 4, 5, 6, 7
			120/240 Volt, 1 Phase & 240 Volt, 3 Phase
	214A30	4	Prior to Spec J
	214A61	4	Begin Spec J
	214A61	4	120 Volt, 1 Phase, 240 Volt, 1 Phase, 120/208 Volt, 3 Phase, 120/240 Volt, 1 Phase, Reconnectible, 120/240 Volt, 3 Phase, 220/380 Volt, 3 Phase, and 277/480 Volt, 3 Phase
			Key 8
	214A48	4	Prior to Spec D
	214A65	4	Begin Spec D
			Key 9, 10
	214A48	4	Prior to Spec D
	214A66	4	Begin Spec D
14	BRUSH, COLLECTOR RING		
			Key 1, 2, 3, 4
	214A50	4	120 Volt or 240 Volt, 1 Phase
			120/240 Volt, 1 Phase
	214A62	3	Prior to Spec J
	214A56	3	Begin Spec J
	214A56	4	120/208 Volt, 3 Phase, 120/240 Volt, 1 Phase, Reconnectible, 120/240 Volt, 3 Phase & 220/380 Volt, 3 Phase
			240 Volt, 3 Phase
	214A32	3	Prior to Spec J
	214A50	3	Begin Spec J
			Key 5, 6, 7
	214A56	4	120 Volt, 1 Phase, 120/240 Volt, 1 Phase, Reconnectible & 277/480 Volt, 3 Phase
	214A50	4	240 Volt, 1 Phase
			120/240 Volt, 1 Phase
	214A62	3	Prior to Spec J
	214A56	3	Begin Spec J
	214A56	4	120/208 Volt, 3 Phase
			240 Volt, 3 Phase
	214A32	3	Prior to Spec J
	214A50	3	Begin Spec J
	15,16 SPRING, COMMUTATOR BRUSH		
			Key 1, 2, 3, 4, 5, 6, 7
			Prior to Spec J
	212B1105	4	120 Volt or 240 Volt, 1 Phase
			120/240 Volt, 1 Phase, Reconnectible & 120/208 Volt, 3 Phase (Ref. 16)
	212A1003	4	120/240 Volt, 1 Phase & 240 Volt, 3 Phase (Ref. 15)
	212B1105	4	Begin Spec J (Ref. 16)
			Key 8, 9, 10
	212B1011	4	Prior to Spec D (Ref. 15)
	212B1105	4	Begin Spec D (Ref. 16)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	15,16 SPRING, COLLECTOR RING BRUSH		
			Key 1, 2, 3, 4, 5, 6, 7
	212B1105	4	120 Volt, 1 Phase, 240 Volt, 1 Phase, 120/240 Volt, 3 Phase, 220/380 Volt, 3 Phase & 277/480 Volt, 3 Phase (Ref. 16)
			120/240 Volt, 1 Phase & 240 Volt, 3 Phase
	212A1004	3	Prior to Spec J (Ref. 15)
	212B1105	3	Begin Spec J (Ref. 16)
			120/208 Volt, 3 Phase & 120/240 Volt, 1 Phase, Reconnectible
	212A1123	4	Prior to Spec J (Ref. 16)
	212B1105	4	Begin Spec J (Ref. 16)
17	CONDENSER (.5 MFD.) DC		
			Key 1, 2, 3, 4, 5, 6, 7
	312A17	1	120 Volt or 240 Volt, 1 Phase
	312A27	1	120/240 Volt, 1 Phase (Reconnectible & Non-Reconnectible) & All 3 Phase
	312A17	1	Key 8, 9, 10
18	CONDENSER (.1 MFD.) AC		
			Key 1, 2, 3, 4, 5, 6, 7
	312A58	1	120 Volt or 240 Volt, 1 Phase
	312A58	2	120/240 Volt, 1 Phase
	312A58	3	120/240 Volt, 1 Phase, Reconnectible & All 3 Phase
19	COVER, END BELL		
	211C99	1	Key 1, 2, 3, 4, 5, 6, 7
	211C99	1	Key 8, 9, 10, Begin Spec D
20	232A518	1	Cover, Air Intake, Key 8, 9, 10 - Prior to Spec D
21	BAND, END BELL		
			Key 1, 2, 3, 4, 5, 6, 7
	234B2	1	120 Volt or 240 Volt, 1 Phase
	234C5	1	120/240 Volt, 1 Phase (Reconnectible & Non-Reconnectible) & All 3 Phase
			Key 8
	232B284	1	Prior to Spec D
	234C68	1	Begin Spec D
			Key 9, 10
	232B202	1	Prior to Spec D
	234B65	1	Begin Spec D
22	BELL, END		
			Key 1, 2, 3, 4, 5, 6, 7
	211D97	1	120 Volt or 240 Volt, 1 Phase
	211D98	1	120/240 Volt, 1 Phase (Reconnectible & Non-Reconnectible) & 240 Volt, 3 Phase
			120/208 Volt, 3 Phase
			Key 8, 9, 10
	211D97	1	Begin Spec D
23	211D53	1	Prior to Spec D
24	STUD, GENERATOR THROUGH		
	520A502	2	Key 1, 2, 3 (5/16 x 12-3/16")
	520A498	2	Key 4, 5, 6, 7 (5/16 x 15-11/16")
			Key 8, 9, 10
	520A500	2	Prior to Spec D (5/16 x 13-13/16")
	520A161	2	Begin Spec D (5/16 x 14-1/4")
25	815-48	2	Screw, Round Head Self Tapping (#10-32 x 3/8") - End Bell Cover Mounting, Key 1, 2, 3, 4, 5, 6, 7 (NOTE: Key 8, 9, 10 - Begin Spec D)
26	516-103	2	Pin, Roll - Generator Frame - 1/8 x 1/2"

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
27	SUPPORT, GENERATOR		
			Key 1, 2, 5, 6, 8
	232C1276	1	Prior to Spec D
	232C1257	1	Begin Spec D
	232C1257	1	Key 3, 4, 7, 9, 10
28	COMMUTATOR (DC)		
			Key 1, 2, 3
	203A8	1	50 Hertz
	203A9	1	60 Hertz
	203A127	1	Key 4, 5, 6, 7
	203A134	1	Key 8
	203A130	1	Key 9, 10
29	COLLECTOR RING (AC) KEY 1, 2, 3, 4, 5, 6, 7		
	204A9	1	120 Volt & 240 Volt, 1 Phase
	204A10	1	120/240 Volt (Non-Reconnectible) 1 Phase & 240 Volt, 3 Phase
	204A92	1	120/240 Volt (Reconnectible) 1 Phase, 120/208 Volt, 3 Phase, 127/220 Volt, 3 Phase & 220/380 Volt, 3 Phase

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
30	212A1214	4	Clamp, Brush Rig
31	800-4	4	Screw (1/4-20 x 5/8") - Clamp Mounting
32	862-15	2	Nut, Hex (5/16)
33	850-45	2	Washer, Lock (5/16)
34	862-4	1	Nut, Hex (7/16-14) - Armature Through Stud
35	526-32	1	Washer, Flat (7/16)
36	850-55	1	Washer, Lock (7/16)
37	800-50	4	Screw (3/8-16 x 1") - Generator Adapter Mounting
38	850-50	4	Washer, Lock (3/8)
39	800-50	2	Screw (3/8-16 x 1") - Generator Support to Generator Frame
40	850-50	2	Washer, Lock (3/8)
41	526-30	2	Washer, Flat (3/8)



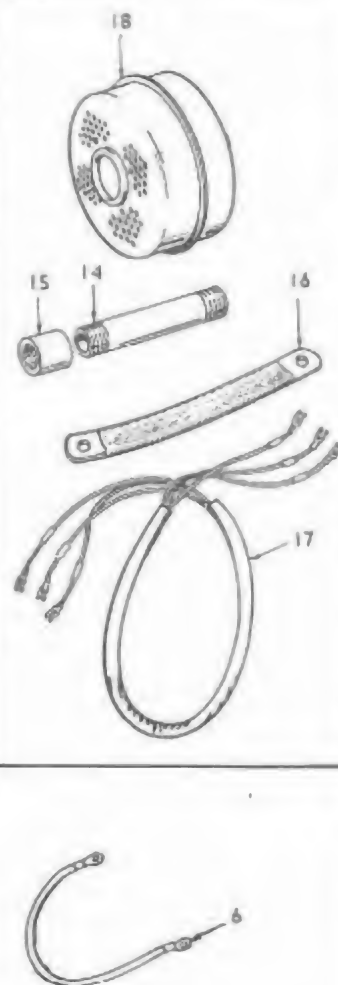
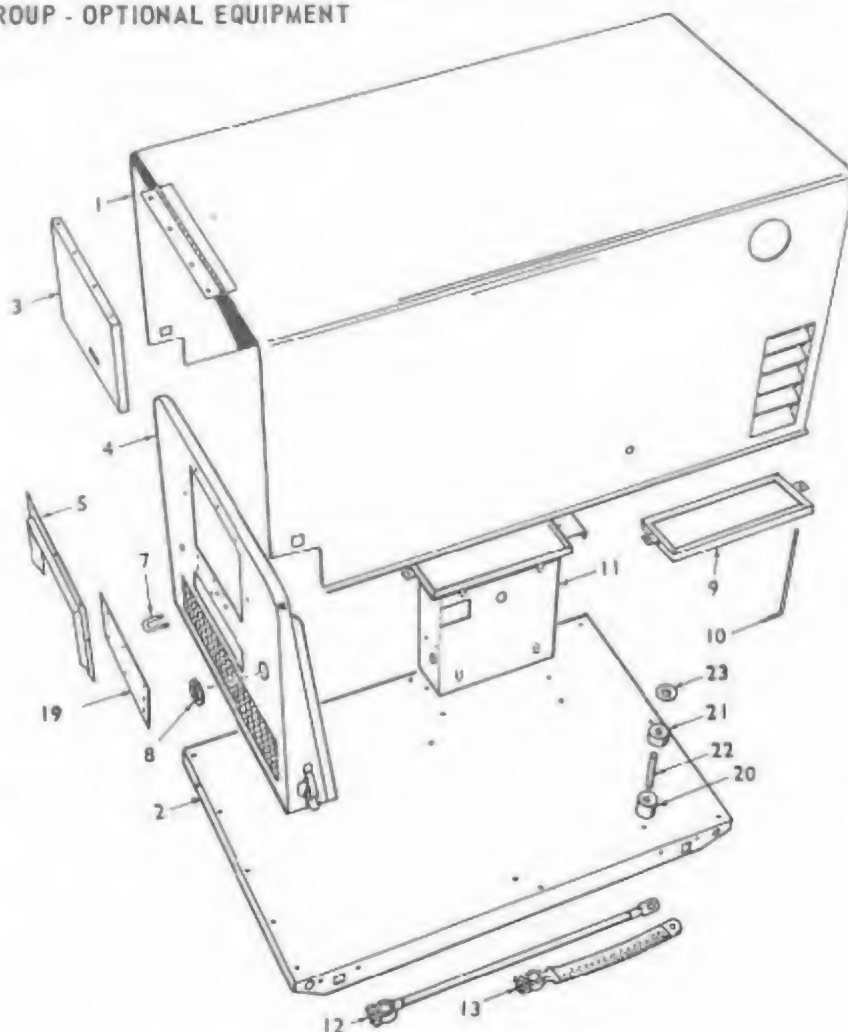
CARRYING FRAME AND DOLLY GROUP  
(Portable Plants)

NOTE: Optional Equipment for Key 2, 6, 8.

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	410C235	1	Dolly Assembly, Complete (Includes Parts Marked *)
1	410A238	2	*Lock, Handle
2	410C148	2	*Bolt, "U"
3	410B233	1	*Axle, Dolly
4	410B147	2	*Handle, Dolly
5	403-205	2	*Grip, Handle
6	410B179	2	*Channels, "U"

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
7	406-62	2	*Nut, Handle
8	800-52	2	*Bolt, Wedge
9	410-236	2	*Wheel & Tire Assy. (16 x 4.00)
10	510-130	4	*Ring, "E" Ret., Wheel to Axle
11	403C406	1	Frame, Carrying Std. for Key 2, 6, 8
12	337A50	1	Strap, Ground, Std. for Key 2, 6, 8

# HOUSING GROUP - OPTIONAL EQUIPMENT



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	405D1001	1	Cover, Hinged - Sides and Top
2	403D358	1	Skid, Mounting
3	301B1378	1	Cover, Instrument Cover
4	405D1000	1	Panel, Housing - Rear
5	405B1035	1	Shield, Rain
6	405A1134	2	Rope, Door Stop
7	405-992	1	Bolt, U
8	508-1	1	Grommet, Rubber (For 1-1/16" Hole)
9	416B495	1	Frame, Battery Holddown
10	416A333	1	Stud, Battery Holddown
11	416C520	1	Tray, Battery Mounting
12	416A14	1	Cable, Battery (15')

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
13	416A385	1	Cable, Battery - Braided (17')
14	505-139	1	Nipple, Oil Drain (3/8 x 2")
15	505-28	1	Coupling, Oil Drain (3/8")
16	337-36	1	Strap, Bond - Grounding
17	338A160	1	Harness, Start-Stop Switch
18	155B522	1	Muffler, Exhaust
19	301B1386	1	Panel, Blank (Receptacle)
20	402A38	4	Cushion, Plant Mtg. (Lower)
21	402A131	4	Cushion, Plant Mtg. (Upper)
22	402A137	4	Bushing, Spacer
23	526A71	8	Washer, Flat - Plant Mounting

## SERVICE KITS AND MISCELLANEOUS

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	98C1100	1	Decal Kit
	160K836	1	Ignition Tune-up Kit
	168K103	1	Gasket Kit, Plant (Replaces 168K67)
	168K95	1	Carbon Removal Gasket Kit
	412C28	1	Cover, Canvas
	522K164	1	Overhaul Kit
	525P90		Paint, Touch-up (Pressurized Can) 12 oz., Mouse Grey Enamel
	525P137		Paint, Touch-up (Pressurized Can) 16 oz., Green Enamel

**NOTE:** For other Kits, refer to the Group for the Part in question.

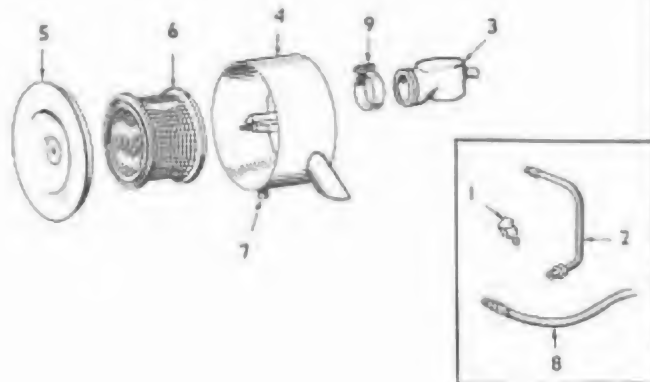
## SPECIAL PARTS SECTION

FOR 4.0CCK-3CE/ & 5.0CCK-3CE/  
(FORMERLY 4CCK-3E2236/ & 5CCK-3E2236/)  
CONTRACTORS MODELS

Parts not listed in this section, refer to the standard parts groups. Use Key 2 for 4.0CCK and Key 6 for 5.0CCK.

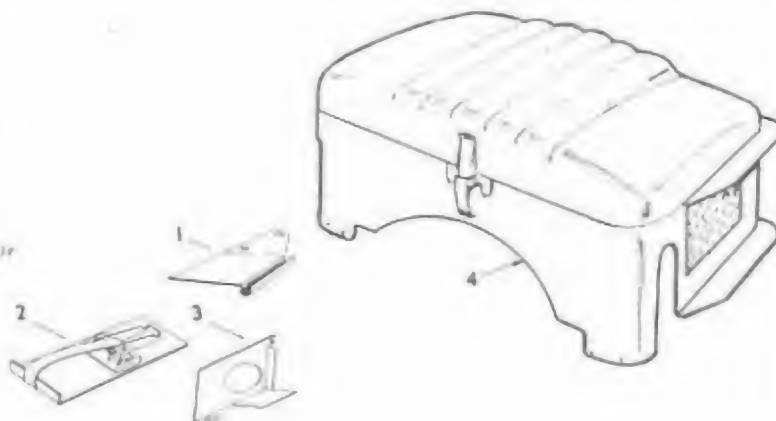
### FUEL SYSTEM GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	502-138	1	Elbow, Fuel Pump Inlet
2	149A775	1	Line, Fuel
3	145A94	1	Inlet, Carb. Air
4	140C537	1	Housing, Air Cleaner
5	140B538	1	Cover, Air Cleaner
6	140B495	1	Cartridge, Air Cleaner
7	140A554	1	Spacer, Air Cleaner Mtg. Screw
8	501A153	1	Line, Fuel (Pump to Filter)
9	503-280	1	Clamp, Air Inlet to Cleaner



### AIR HOUSING AND OPTIONAL AIR SHUTTER GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	405B1663	1	Support, Hood
2	134E1469	2	Fastener, Hood
3	134A1144	1	Baffle, Fuel Pump Air
4	405C1662	1	Hood, Engine



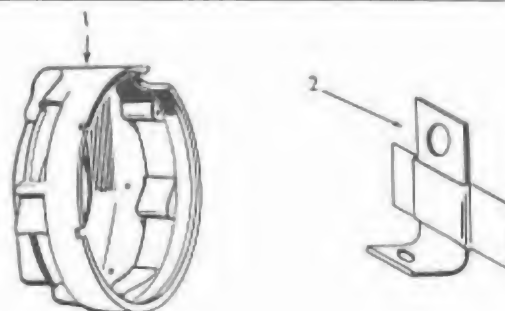
### GEAR COVER, OIL BASE AND OIL PUMP GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	NIPPLE, OIL DRAIN 505-342	1	Early Models (3/8 x 5-1/2")
	505-81	1	Later Models (1/2 x 5-1/2")
2	COUPLING, OIL DRAIN 505-28	1	Early Models (3/8)
	505-14	1	Later Models (1/2)



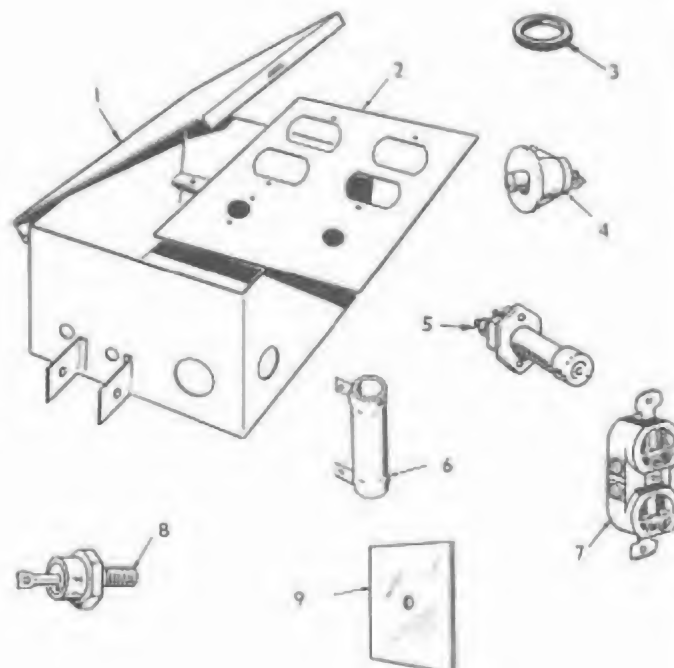
### GENERATOR GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	231C124	1	Adapter, Gen. to Eng.
2	403C827	1	Yoke, Lifting



### CONTROL GROUP

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	301D2880	1	Box, Control
2	301B2881	1	Panel, Cont. Box.
3	GROMMET, CONTROL BOX 508A2	1	For 1/2" Hole
	508-8	1	For 13/16" Hole
	508-9	1	For 1-3/8" Hole
4	313P18	1	Switch, Stop
5	308A28	1	Switch, Start
6	304A139	1	Resistor (2.5-Ohm, 25-W)
7	RECEPTACLE, DUPLEX 323-184	1	120-Volt
	323-213	1	240-Volt
8	305P235	1	Rectifier
9	305A256	1	Bracket, Rectifier



## NOTES

# CUSTOMER SERVICES

OWNER'S WARRANTY SERVICE -  
ENGINE DRIVEN ELECTRIC GENERATOR SETS,  
SEPARATE GENERATORS, INDUSTRIAL ENGINES

## QUALITY OF PRODUCT

Onan products are engineered and designed to perform as stated on product nameplate and published specification. With proper installation and operation, regular maintenance and periodic repair service, the equipment will provide reliable service.

## GENERAL WARRANTY PRACTICES

All Onan-manufactured engine-driven electric generator sets, separate generators, and industrial engines are sold with a full one-year warranty. This warranty is issued only to the original user and promises satisfactory performance of the product when properly installed, serviced, and operated under normal conditions, according to the manufacturer's instructions. The text of the Onan published warranty appears in the Onan Operator's Manual sent with the product.

**Warranty Registration:** A Warranty Registration card accompanies each Onan Product. This card must be properly filled out and returned to the Onan Factory in order to qualify for warranty consideration as covered in this bulletin. When requesting warranty repair work you must provide the purchase date, Onan model, and serial number of the equipment.

**Warranty Authorization:** Warranty service must be performed by Onan Factory or Onan Authorized Distributors or their Approved and Registered Service Dealers. A complete listing of these Onan Authorized Parts and Service Centers is provided in our brochure F-115, a copy of which is supplied with each Onan Product. These Onan Authorized Service Centers have trained service personnel, parts stock, and the necessary facilities and tools for the service and repair of Onan equipment.

**Material Allowances:** Onan will allow credit or furnish free of charge to the Onan Authorized Service Station or his Approved Service Dealer, all genuine Onan parts used in a warranty repair of these products which fail to perform as warranted.

**Labor Allowance:** Onan will allow warranty repair credit to the Onan Authorized Parts and Service Center and his Approved Dealer at straight time labor when the cause of failure is determined to be defective material or factory workmanship. This labor allowance will be based on the factory's standard time schedule of published flat rate labor allowances, or, otherwise a time judged reasonable by the factory. Repair work not covered by warranty will be charged to the owner. The Onan's Warranty practice does not provide for allowance of expenses such as start-up charges, communication charges, transportation charges, travel time and/or mileage, unit removal or installation expense, cost of fuel, oil, normal maintenance adjustments, tune-up adjustments or parts maintenance items, and does not cover incidental or consequential damages.

**Administration:** Warranty of Onan Products is administered through Onan Authorized Distributors in whose territory the equipment is located. These Distributors and their Approved or Registered Onan Service Dealers are authorized to make settlement of all customer warranty claims within the limits of the manufacturer's warranty policy as described herein.

Onan reserves the right to change warranty practices without prior notice.

## **MAINTENANCE**

A Planned Preventive Maintenance Program is extremely important if you are to receive efficient operation and long service life from your Onan unit. Neglecting routine maintenance can result in premature failure or permanent damage to your equipment. The Onan Operator's Manual sent with the product contains recommended maintenance schedules and procedures.

Maintenance is divided into two categories:

1. Operator Maintenance . . . . . performed by the operator.
2. Critical Maintenance . . . . . performed only by qualified service personnel.

Regular maintenance will help you avoid sudden and costly repairs in the future. Adequate evidence of this scheduled maintenance must be offered when applying for a warranty claim.

## **INSTALLATION**

Installation is extremely important and all Onan Products should be installed in accordance with the manufacturer's recommendations. If the owner experiences any difficulty with such items as mounting, ventilation, exhaust location, fuel lines, wiring, etc., he should immediately contact the company from whom he purchased the equipment so that corrective action can be taken. Although the Onan Authorized Distributor and his Approved or Registered Service Dealers may be able to remedy certain installation difficulties, such repair work is not considered Onan warranty and there will be a charge for this service.

Onan

Minneapolis, Minnesota 55432

MSS-22B

Replaces 23B054 and MSS-22A

Rev. 7-2-73



**ONAN** 1400 73RD AVENUE N.E. • MINNEAPOLIS, MINNESOTA 55432  
A DIVISION OF OHAIR CORPORATION

